the TECHNOLOGY DEPARTMENT

CHEMICAL AGE

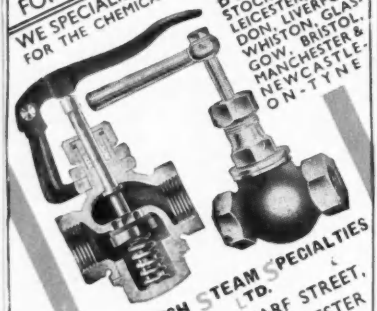
VOL LIX 25 DECEMBER 1948 No 1537

PUBLIC LIBRARY
JAN 14 1949
DETROIT

Monsanto wish
their many friends
a Happy Christmas
and a Prosperous
New Year

MONSANTO CHEMICALS LIMITED

TRADE B-O-S-S MARK
VALVES, OF ALL TYPES IN ALL METALS FOR ALL PRESSURES AND DUTIES
WE SPECIALISE IN ENGINEERS' REQUIREMENTS FOR THE CHEMICAL AND ALLIED TRADES.
STANDARD PRODUCTIONS FROM STOCKS AT:— LONDON, LIVERPOOL, LEICESTER, WHISTON, GLASGOW, BRISTOL, MANCHESTER & NEWCASTLE-ON-TYNE



BRITISH STEAM SPECIALTIES LTD.
WHARF STREET, LEICESTER

ACIDS
*NEW BUYERS ESPECIALLY INVITED
•METAL FINISHING
NITRIC, HYDROCHLORIC, SULPHURIC, DIPPING ACIDS & SUNDRY CHEMICALS
•PROCESS ENGRAVING
NITRIC ACID, IRON PERCHLORIDE (LIQUID OR SOLID) SUNDRY CHEMICALS
•GARAGES, ETC.
ACCUMULATOR ACIDS (ALL STRENGTHS) DISTILLED WATER
GEO. F. BOOME & SON LTD.
STAR CHEMICAL WORKS
WATTS GROVE, BOW, E.3
PHONE EAST 2264-5

B.S.S.334
CHEMICAL SHEET LEAD
CHEMICAL LEAD PIPE
COX BROS. & CO.
(Derby) Ltd.
LEAD WORKS, DERBY
AND AT NOTTINGHAM

PUMPS
FOR ALL PURPOSES
Centrifugal and Diaphragm
1½" to 4" dia.
PETROL, ELECTRIC OR HANDPOWER
NEW AND RECONDITIONED.
SALE OR HIRE.
RING GREENWICH 3189
THE GREENWICH PUMP & PLANT CO., LTD.
DENHAM ST., GREENWICH S.E.10

NASH HYTOR VACUUM PUMPS AND COMPRESSORS

FOR THE CHEMICAL AND ALLIED INDUSTRIES

Many entirely new problems have been solved successfully since 1939; we might also help you with our acquired experience if you communicate with

NORMAN ENGINEERING COMPANY

BRITISH AGENTS AND SERVICE ENGINEERS FOR

NASH ENGINEERING Co. (GREAT BRITAIN) LTD.

HYTOR WORKS, COMMERCE WAY, PURLEY WAY,

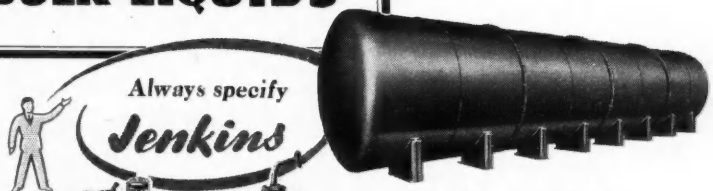
CROYDON

Telephone: CROYDON, 2278/9.

Telegrams: "NASHNORMA", CROYDON

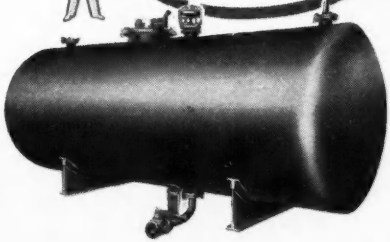
Welded TANKS *for* BULK LIQUIDS

Always specify *Jenkins*



Mild Steel Storage Tank

EXPORT ENQUIRIES INVITED



Mild Steel Acid Rail Transport Tank

THE SIGN OF GOOD WELDING

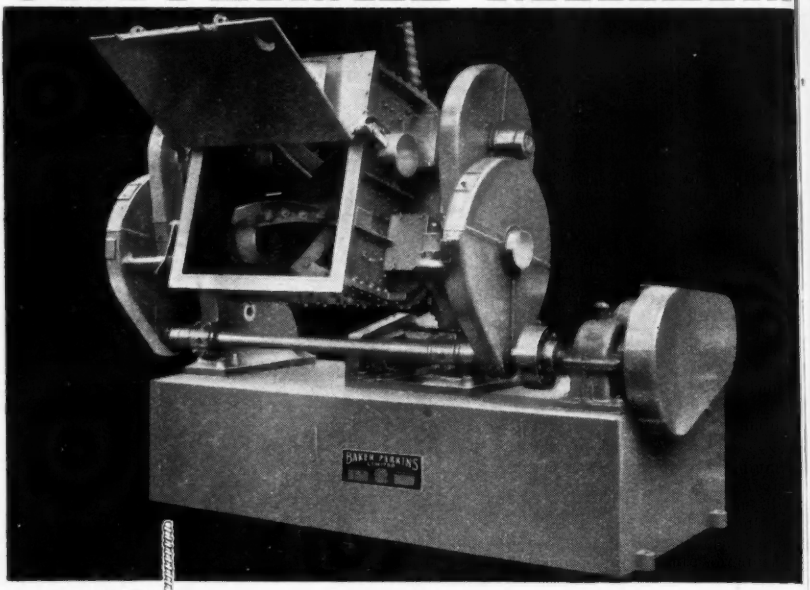
Telephone: 4201-6 (6 lines)

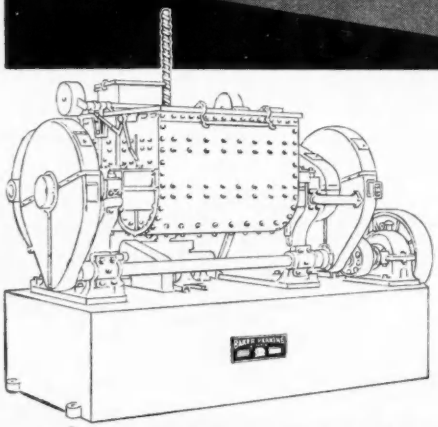
Robert Jenkins & Co. Ltd. ESTABLISHED 1814 ROTHERHAM

Hopwood

A

UNIVERSAL MIXERS





The Universal principle is capable of very many adaptations. Here, for instance, is a special machine for mixing Dry Battery Paste. Trough interior and blades are coated with rubber and renewable blade-shoes of hard metal are fitted.

BAKER PERKINS LTD
Engineers
WESTWOOD WORKS – PETERBOROUGH

INDEX TO ADVERTISERS
IN THIS ISSUE

	Page
Baker Perkins, Ltd.	ii
Barrowfield Leather Co., Ltd.	vi
Blackwell's Metallurgical Works, Ltd.	xxiv
Bolton & Hayes, Ltd.	Cover iii
Boome, Geo. F., & Son, Ltd.	Cover ii
Boots Pure Drug Co., Ltd.	xiv
Bowmans Chemicals, Ltd.	xxiv
Braby, Fredk., & Co., Ltd.	xiv
British Steam Specialties, Ltd.	Cover ii
Callow Rock Lime Co., Ltd., The	Cover iii
Castle Engineering Co. (Nott.), Ltd., The	Cover iv
Chemical Plant & Equipment Co., Ltd.	xxiii
Chesterfield Tube Co., Ltd., The	xv
Clayton Aniline Co., Ltd., The	iv
Classified Advertisements	xx, xxi, xxii & xxiii
Collacott, R. A., & Partners	xxiv
Cox Brothers & Co. (Derby), Ltd.	Cover ii
Danks of Netherton, Ltd.	viii
Derbyshire Stone, Ltd.	xxiii
Electro-Power Service Co., The	xxiv
Farnell Carbons, Ltd.	xxiv
Feltham, Walter H., & Son, Ltd.	xxiv
Fielding, T. H., & Sons, Ltd.	xxiv
Foster Yates & Thom, Ltd.	xvi
Foxboro-Yoxall, Ltd.	v
Greenwich Pump & Plant Co., Ltd., The	Cover ii
Hackbridge & Hewittic Electric Co., Ltd.	vi
Harris, Francis W., & Co., Ltd.	xxiii
Hick Hargreaves & Co., Ltd.	xii
Hull Development Committee, The	viii
Imperial Smelting Corporation, Ltd.	vii
Iodine Educational Bureau, The	x
Jenkins, Robert, & Co., Ltd.	i
Jenkinson, W. G., Ltd.	xxiii
Kent, James, Ltd.	Cover iii
Kestner Evaporator & Engineering Co., Ltd.	xix
Kilner, John, & Sons (1927), Ltd.	xxiii
Laporte Chemicals, Ltd.	xix
Leeds & Bradford Boiler Co., Ltd.	xxiii
Lennox Foundry Co., Ltd.	xxiv
Lord, John L.	Cover iv
Mirvale Chemical Co., Ltd.	viii
Monsanto Chemicals, Ltd.	Front Cover
Norman Engineering Co., Ltd.	i
Northern Glass & Instruments, Ltd.	iii
Organic Dyestuffs, Ltd.	xii
Orr, Geo. W., & Co., Ltd.	viii
Paget, Dr., R. F.	xx
Paterson Engineering Co., Ltd.	xviii
Pulsometer Engineering Co., Ltd.	xviii
Reads, Ltd.	xiii
Siebe Gorman & Co., Ltd.	xvii
Spencer Chapman & Messel, Ltd.	xvi
Tanks & Linings, Ltd.	ix
Tees Side Bridge & Engineering Works, Ltd., The	xii
Thermal Syndicate, Ltd., The	xi
Widnes Foundry & Engineering Co., Ltd.	867
Yorkshire Tar Distillers, Ltd.	x

"NORGIL"

SCIENTIFIC GLASSWARE

for your particular problem.

However exacting your requirements, whether precision volumetric, or ground apparatus, or simple products of maximum uniformity, you will find complete satisfaction in 'NORGIL' Laboratory Glassware.

Already preferred by many Laboratories, 'NORGIL' demonstrates our ability to be of service to you. We offer good delivery too.

Consult your Laboratory Furnisher today, and specify 'NORGIL' Apparatus *'for your particular problem.'*

NORTHERN GLASS & INSTRUMENTS LTD.
HENDON DOCK. SUNDERLAND.

NORTHERN GLASS NORGIL & INSTRUMENTS LTD

THE *Clayton*

ANILINE COMPANY LIMITED
CLAYTON, MANCHESTER 11

Telephone: EAST 1341 (10 LINES) Telegrams: "CIBA MANCHESTER"

SOLE CONCESSIONNAIRES IN THE UNITED KINGDOM FOR
CIBA LIMITED, BASLE, SWITZERLAND.

BRANCHES AT LONDON, BRADFORD, LEICESTER, GLASGOW, BELFAST, BRISTOL

fait accompli . . .

Thirty years of development and manufacturing experience enable Foxboro to offer industry, Recorders and Controllers for temperature, pressure, humidity, liquid level, flow and other process measurements fully certified and guaranteed. CERTIFIED for accuracy and response—GUARANTEED for functional reliability . . .

fait accompli.

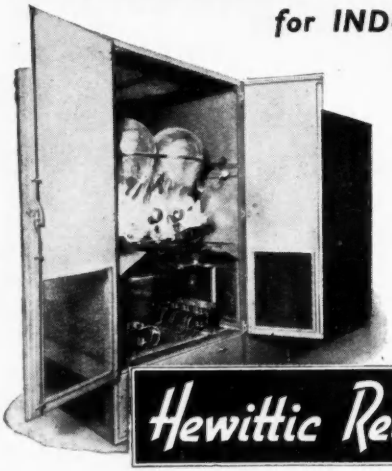
FOXBORO-YOXALL LTD

LOMBARD ROAD, MERTON, LONDON, S.W.19

British made instruments

Converting A.C. to D.C.

for INDUSTRIAL APPLICATIONS



THE problem of providing a D.C. supply—for the operation of electrolytic plant, electric locomotives and trucks, cranes, hoists and variable speed D.C. drives, lifting magnets, magnetic clutches and separating plant, for small scale or bulk charging of batteries for electric vehicles, etc.—for almost every application where D.C. is required—is most effectively solved by installation of a HEWITTIC Rectifier, **the simplest, most reliable converting plant made.**

This equipment operates at high effiency with correspondingly *low running costs*, requires negligible maintenance, operates completely *unattended*, and is easily installed in existing buildings and awkward sites, without special foundations or the need for crane facilities.

Hewittic Rectifiers

OVER A MILLION K.W. IN WORLD-WIDE SERVICE

HACKBRIDGE AND HEWITTIC ELECTRIC CO. LTD. WALTON-ON-THAMES, SURREY.
Telephone: Walton-on-Thames 760 (8 lines) *Telegrams: "Electric, Walton-on-Thames"*

BARROWFIELD

LEATHER CO. LTD.

TANNERS CURRIERS

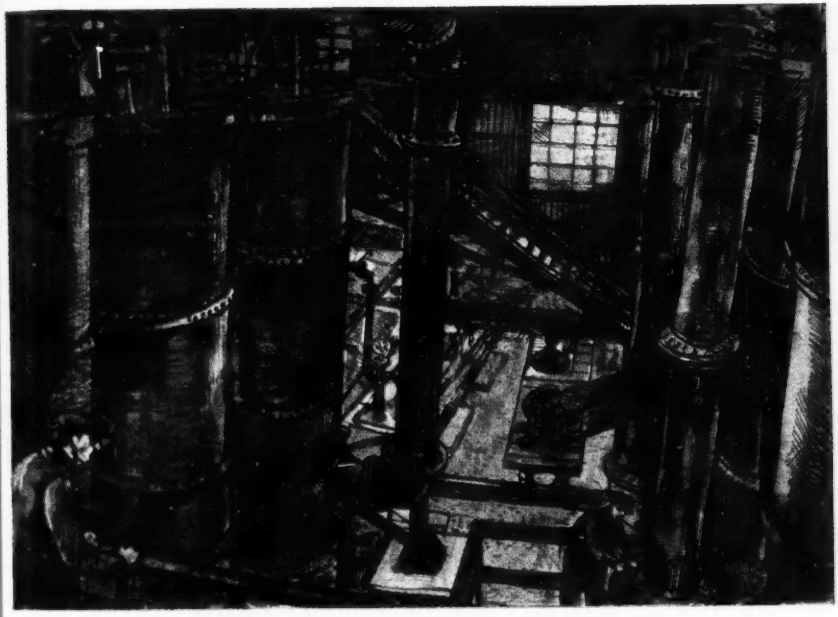
TECHNICAL LEATHER SPECIALISTS

HYDRAULICS

Hydraulic Leathers. Belting and Banding
Laces. Oil Seals, Gaskets and Washers.
Strapping of all descriptions

CONSULT US ON ALL MATTERS AFFECTING MECHANICAL LEATHERS

BARROWFIELD LEATHER CO. LTD.
47, SOLWAY STREET, GLASGOW, S.E.



Key chemical

OUR ILLUSTRATION shows one section of the square mile of our Avonmouth works. Here — and at our Seaton Carew, Swansea and Newport factories — we produce sulphuric acid in quantities which rank us among the largest sulphuric acid producers in Europe.

One of our special points of pride, by the way, is that in 1939, when war cut off supplies of imported vanadium catalyst, we were able to step up production of our Imperial Smelting Corporation catalyst and to supply this first-rate British product to so many other sulphuric acid manufacturers.

IMPERIAL SMELTING CORPORATION LIMITED

37 Dover Street London W1

ESTABLISHED 1840

DANKS OF NETHERTON LTD.

CHEMICAL PLANT
PRESSURE VESSELS
JACKETTED PANS
MIXERS RECEIVERS

ALL TYPES OF WELDED AND RIVETED STEEL FABRICATIONS

NETHERTON, DUDLEY
WORCS.

LONDON OFFICE—
329, HIGH HOLBORN, LONDON, W.C.1

1 CWT. KEGS
—7 DAY DELIVERY—

COOPERED IRON HOOPED KEGS SUITABLE FOR DRY MATERIALS MEASURING 13" X 22"

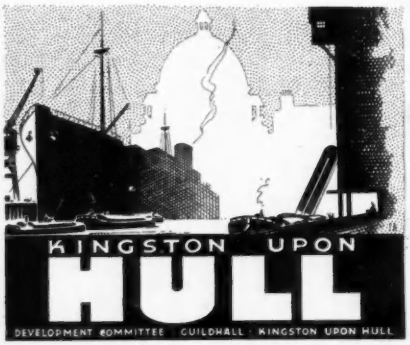
DESIGNED AND MANUFACTURED BY US SPECIALLY FOR THE HOME & EXPORT CHEMICAL TRADES.

Sample on request

GEO. W. ORR & Co. Ltd.
8 COUSTONHOLM ROAD,
GLASGOW, S.3.
Telegrams: Containers, Glasgow. Telephone: Langside, 1777.

Britain's Third & Cheapest Port

Enquiries invited for sites (with or without river frontage).
Distribution area—14,000,000 population.
Skilled and unskilled male and female labour available.



Mirvale

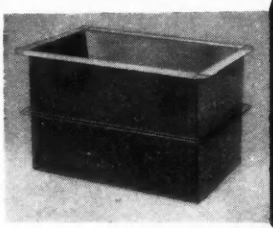
Cresylic Acid

CRESOLS, PHENOL
HIGH BOILING TAR ACIDS
CRESYLIC CREOSOTE
NAPHTHALINE, PYRIDINE

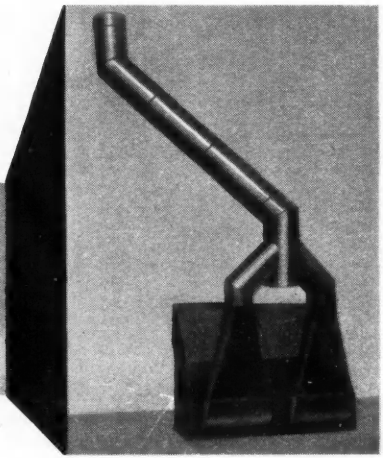
MIRVALE CHEMICAL CO. LIMITED
MIRFIELD, YORKS. Phone Mirfield 2157

Improved Technique

in chemical plant construction



Nutradur Electrolytic Tank.



Fume Exhaust Ducts fabricated of Nutradur.

Our illustrations show the versatility of NUTRADUR (unplasticised p.v.c. material) for fabrication of Chemical Works Equipment.

NUTRADUR offers many advantages :—

Comparable in strength with most metals, yet corrosion-proof.

Easier fabrication and welding than stainless steel.

Completely homogeneous : needs no exterior painting or interior lining.

Alterations and extensions easily effected : can be welded on site.

Economical in initial cost and subsequent use.

Send us your enquiries for Fume Ducts, Fans, Pipelines, Valves, Pumps, Tanks, etc.

NUTRALINES

Also ask about our complete line of acid and alkali-proof cements and coatings.

TANKS AND LININGS LTD

DROITWICH

TELEPHONE DROITWICH 2249/0

TOWN WHARF, DROITWICH

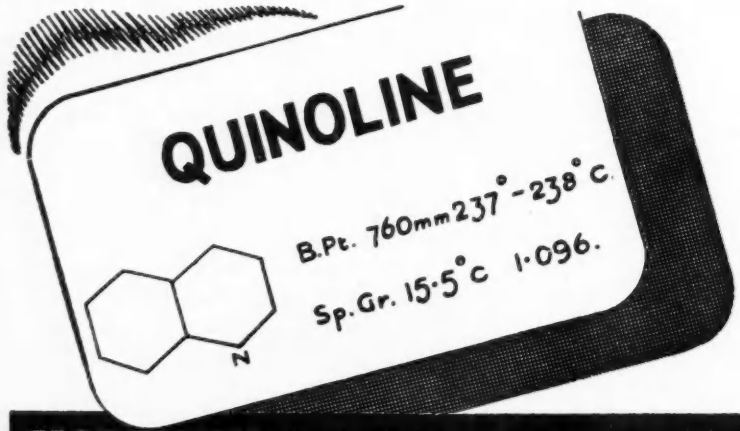
NEW LIFE FROM A LOST WORLD

LIFE cannot exist without iodine. Yet the greater part of our supplies of iodine come from the million-year-old deserts of Northern Chile. In the midst of this lifeless plateau, the Chilean iodine producers have built *oficinas* where thousands of workers live a full and satisfying life. In these man-made oases the nitrate bearing soil is made to give up its iodine.

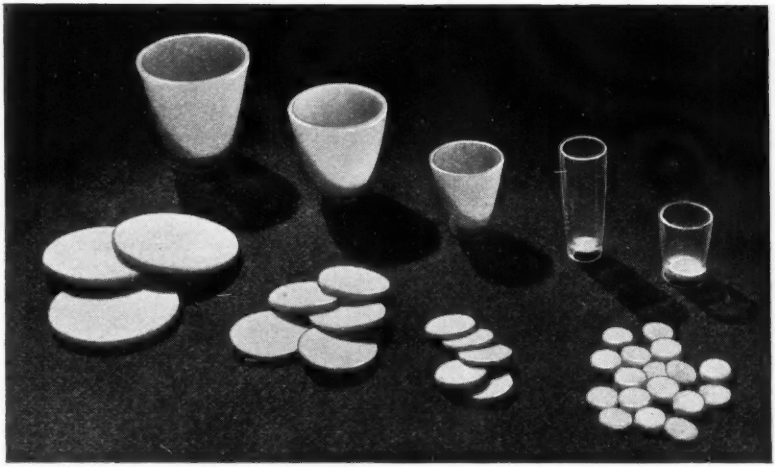
Each year these deposits become more valuable. New uses for iodine in medicine, agriculture and industry are constantly being found. The applications of iodine include the manufacture of heat-sensitive and germicidal paints, dyes, paper, textiles, the treatment of eye, skin and respiratory diseases. In agriculture iodine is vital to animal nutrition and health.

A vast store of technical data on the uses of iodine has accumulated since iodine was discovered 187 years ago. This information is recorded and constantly kept up-to-date by the Iodine Educational Bureau. A fully qualified technical staff is ready to assist with professional research problems. There is no charge for the Bureau's service. It is sponsored by the principal Chilean nitrate and iodine producers.

Iodine Educational Bureau 14 STONE HOUSE, BISHOPSGATE, LONDON, E.C.2



YORKSHIRE TAR DISTILLERS LTD
CLECKHEATON, YORKS.
TEL. CLECKHEATON 790 (5 LINES) YTD TELEGRAMS TO- YOTAR CLECKHEATON



VITREOSIL

FILTERING AND IGNITION CRUCIBLES

Precipitates can be filtered, ignited, and weighed all in the same vessel with ease and accuracy by even semi-trained staff. The crucibles are of the same material as the discs which are fused to them, and can be ignited to 1,000° C.

The filter disc of every crucible is thoroughly tested for pore size and permeability by our expert examining staff before being passed. Average pore size and applications are identified with the following grades of porosity :—

No. 1 (90 to 150 microns)—for filteration of coarse precipitates, coarse gases, and coarse grain material.

No. 2 (40 to 90 microns)—for preparative work with crystalline precipitates.

No. 3 (15 to 40 microns)—for fine precipitates, fine gas filters, and retention of fine material.

No. 4 (5 to 15 microns)—for analytical and preparative work with very fine precipitates such as barium sulphate.

POROUS DISCS

in the above-mentioned porosities can be supplied separately for customers' own uses.

Other apparatus incorporating VITREOSIL porous discs can be supplied to specification, and Grote-Krekeler combustion tubes are available.

WRITE FOR DETAILS OF SIZES AND PRICES

THE THERMAL SYNDICATE LTD

Head Office: **WALLSEND, NORTHUMBERLAND**

London Office: **12-14, OLD PYE STREET, WESTMINSTER, S.W.1**

Manufacturers of

Aniline Colours and Pigments

Pattern Cards on Request

ORGANIC DYESTUFFS LIMITED

Pendleton Mills, Croft-st., Pendleton

Tele: Pendleton 1031
'Grams: "Fascolour, Manchester"

"Tees Side"

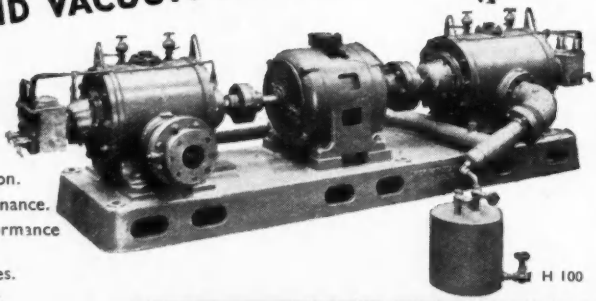
Our strength lies in our proved ability to take on difficult "special" work and to engineer quantity production on successful lines.

Our work embraces such diverse items as transmission towers and fuel storage tanks, railway stations and lorry chassis, steel bridges and steel barges, power stations and gasworks steelwork, blast-furnace plant and briquetting machines.

THE TEES SIDE BRIDGE & ENGINEERING WORKS, LIMITED.
WORKS & HEAD OFFICES: MIDDLESBROUGH
TELEPHONE: 2021-4
LONDON OFFICE: 17 VICTORIA STREET, S.W.1
TELEPHONE: ABBEY 1613

Rotary Compressors

AND VACUUM PUMPS



H 100

Ease of installation.
Minimum maintenance.
High initial performance maintained.
No moving valves.
Continuous flow.
Roller bearings.
Metallic glands.

HICK HARGREAVES
AND COMPANY LTD BOLTON

introducing

the NEW

RINGSEAL lever tin

Unlike other pilfer-proof devices which involve additional labour, time or machinery, the Ringseal tin is capped and sealed in one operation, using standard hand presses or capping machines. The Ringseal unbroken is a guarantee that the contents of the tin have not been tampered with and its absence is an indication of pilferage. Once opened by the consignee it is used as an ordinary lever tin, with its replaceable cover.

Trade enquiries are invited from users of lever tins, and from manufacturers desirous of acquiring a licence to utilise Ringseal closures on their own production of lever tins. Ringseal necks are covered under British Patent Applications Nos. 480319, 480339, 8804/47, 19549/47, and Patent Applications have been made in most countries in the world.

■ *Ringseals consist of circular metal stampings, forced into an inclined annular groove in the lever-ring when pressure is applied from above.*

■ *Ringseal tins require no complicated closing tools and no tools for opening; they do not increase the physical dimensions of containers and they do not absorb ullage.*

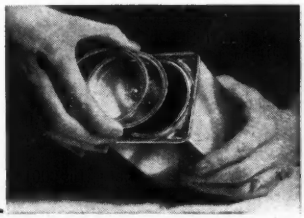
■ *Ringseal closures are equally applicable to round, square or irregularly-shaped conventional lever tins, and, if necessary, covers can incorporate a latex lining or a rubber ring for vacuum, hydroscopic and liquid packs.*

■ *Ringseals, once locked into position, cannot be removed without first breaking the seal, and once broken, cannot be replaced.*

RINGSEAL

pilfer-proof
lever lid tins

READS LIMITED, Orrell House, Orrell Lane, Walton, Liverpool, 9. Aintree 3600 and 227 Grand Buildings, Trafalgar Square, London, W.C.2. WHitehall 5781
Also at Glasgow, Belfast and Cork



R4031/1-C

Nicotinic Acid is now in adequate supply

Trade Price List for Medical Specialities now available

Further information on request from

BOOTS PURE DRUG CO. LTD. NOTTINGHAM ENGLAND

Phone: Nottingham 45501

London Sales Office—71 Fleet St. London EC4 (Phone: Central 6901)

Boots

C-1

"BRABY" REGD.

STEEL DRUMS

SINGLE TRIPPER & RETURNABLE TYPES

Our factory at Liverpool is designed and equipped for the production of high grade steel drums of many types, which can be supplied Painted, Galvanized, Tinned or Lacquer lined. Certain types can also be made from Stainless Steel.

FRED^K BRABY & Co. Ltd

LIVERPOOL:	HAVELOCK WORKS, AINTREE, LIVERPOOL, 10. . . .	TEL:	AINTREE 1721
LONDON:	FITZROY WORKS, 352-364, EUSTON ROAD, N.W.1.	TEL:	EUSTON 3456
EXPORT:	110, CANNON STREET, LONDON E.C.4	TEL:	MANSION HOUSE 6034

ALSO AT GLASGOW, BRISTOL, BELFAST & PLYMOUTH

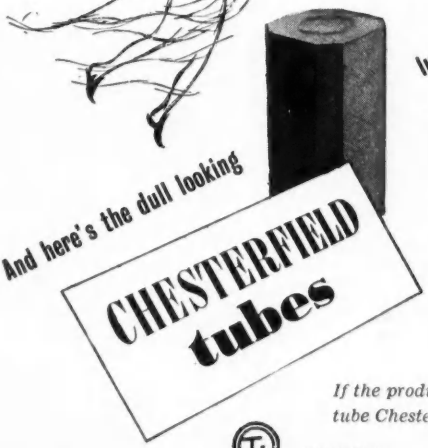
Here's the finished product—

A Beautiful and Precise piece of Engineering —A Weldless Steel Boiler Drum.

35″ internal diameter x 2½″ thick x 11′ 6″ overall length.

lump of raw steel from which it grew

From which it grew in only three main operations. First — piercing by a 5,000 tons hydraulic press which pierces a hole in the billet and forms a cup-shaped hollow. Then drawing through dies which reduce the outside diameter and thickness of the bloom and increase the length. And finally, accurate machining on giant machine tools to finished dimensions. Cinderella's Fairy Godmother had nothing on us.



And here's the dull looking

CHESTERFIELD tubes

If the product you want is basically a large steel tube Chesterfield will do the whole job for you — literally, in one.

A TI COMPANY

THE CHESTERFIELD TUBE CO., LIMITED, CHESTERFIELD. ENGLAND

CRC14

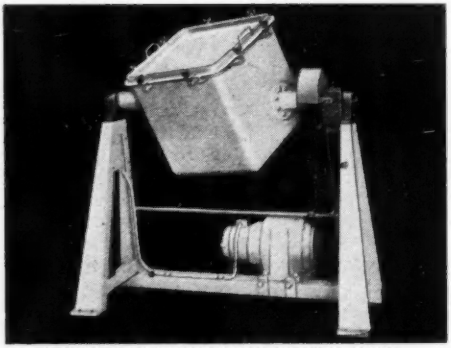
ACIDS

HANDLING - STORAGE - APPLICATION

It is part of our service to advise anyone on the handling, storage and application of Corrosive Acids. Our advice is seasoned by 80 years' experience of manufacturing commercial and pure acids for every type of industry all over the world. OLEUM - SULPHURIC - BATTERY ACID HYDROCHLORIC - NITRIC DIPPING ACID *and Distilled Water supplied in any quantity.*

SPENCER CHAPMAN & MESSEL, LTD.

33, CHANCERY LANE · LONDON, W.C.2. Works: Silvertown E.16. Telephone: HOLborn 0372 (3 lines) A & T



A SPECIAL HIGH EFFICIENCY POWDER MIXER
Supplied in a wide range of sizes for a wide variety of trades

HYDRAULIC EQUIPMENT
HYDRAULIC & POWER PRESSES
CHEMICAL PLANT
RUBBER MACHINERY
WELDED FABRICATION WORK
CLASS "A" PRESSURE VESSELS
SHELL TYPE BOILERS
STEAM RAISING EQUIPMENT

FOSTER YATES & THOM LTD

Heavy Precision Engineers

BLACKBURN ENGLAND

ARMIT INVIDIA

PROTECTION

IN Chemical Works, Refrigerating Plants, etc., the necessity for dealing with gas escapes and repair work calls for efficient protection of the men on the job.

This is provided by the "PURETHA" Respirator, which is comfortable, efficient and simple. Its canisters are coloured according to the gas or group of gases against which they give protection. Full mask and mouthpiece, nose-clip and goggle types. All other protective devices for the industrial worker also manufactured and supplied: Self-contained breathing apparatus, smoke-helmets, short-distance fresh-air apparatus, resuscitating apparatus, dust masks, protective clothing, goggles, etc.

SIEBE, GORMAN & CO., LTD.
LONDON
EVERYTHING FOR SAFETY EVERYWHERE

TOLWORTH, SURBITON, SURREY.

Telephone: Elmbridge 5900

Telegrams: Siebe, Surbiton

B

Pulsometer Pumps

ALL DUTIES
For
Food and
Chemical
Industries
and
Processes

LIST No. 3086

Pulsometer Engineering C° L°
Nun Close Works, Reading

PATERSON DRY CHEMICAL FEEDER

Extensively used for the application of

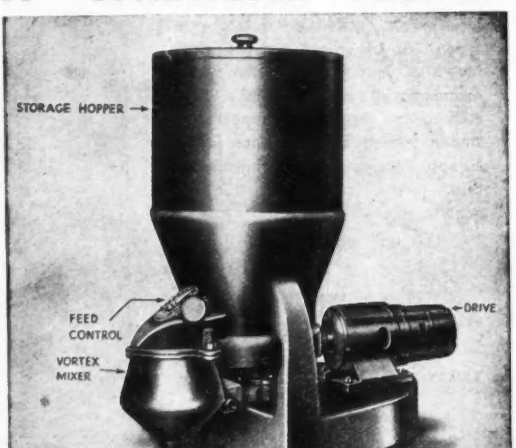
POWDERED REAGENTS

for Water Treatment purposes and for measuring and proportioning powdered or Granular Substances.

●

Technical details from

PATERSON ENGINEERING CO., Limited
83, KINGSWAY, LONDON



The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

BOUVERIE HOUSE, 154 FLEET STREET, LONDON, E.C.4

Telegrams: ALLANGAS FLEET LONDON Telephone: CENTRAL 3212 (20 lines

SCOTTISH OFFICE:
116 Hope Street, Glasgow (Central 3970)

MIDLANDS OFFICE
Daimler House, Paradise Street, Birmingham (Midland 0784-5)

THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited

VOL. LIX
No. 1537.

25 December 1948

Annual Subscription 26s.
8d. per copy, post paid, 10d.

A Cautionary Tale

WHAT are the Government's objectives when it seeks information concerning policy and prospects and proposes a more intimate relationship between itself and a particular industry? There are many answers to that question, of which the conventional one—to promote the wellbeing and enhance the productiveness of the industry by official aid—does not square with all the facts. The Board of Trade's request that the Association of British Chemical Manufacturers shall provide it with an overall survey of present conditions and future prospects has now brought that question very prominently to mind, while from another quarter—the British Iron and Steel Federation—has come a document reviewing what has been the reward of the steel industry's close collaboration with the Government in the past, and what are likely to be the results of the Government's decision to adopt the rôle of the wolf in the tale of the Three Little Pigs. It presents in relation to the situation, if the Iron and Steel Bill is enacted, a picture of arbitrary division and confusion of functions capable of rendering a great industry almost impotent in a few years.

It first shows most convincingly, with tabulated statistics, how very far from the business of iron and steel making the Government corporation is proposing to wander if it acquires control of 107 firms and 250 subsidiaries named in the Bill. Taking four typical examples from the firms to be nationalised, the Iron and Steel Federation shows how relatively few of those they employ are concerned with the basic production of iron ore, pig-iron, ingots and hot rolled material (Bayliss, Jones & Bayliss, Ltd., 8.4 per cent; Wm. Beardmore & Co., Ltd., 14.2; Richard Johnson & Nephew, 7.1; the Carron Company 4.4).

The whole document reveals how flimsy is the original Government argument that action was imperative by the need for national control of the basic business of iron and steel production and, of even more topical interest, it shows what is now seen to have been a corollary of the establisment of Development Councils.

"An essential function envisaged for development councils," says the Iron and Steel Federation, "is the provision of common services covering research, statistics, development, etc., very much on the lines of those provided by the federation. But if the view now gains currency the industries whose activities are so co-ordinated and serviced are regarded by the Government as being 'ripe for nationalisation' this will clearly render the development council concept abortive and will also prejudice other forms of organisation on an industrial basis, however construc-

On Other Pages

Leader:
A Cautionary Tale 837
Notes and Comments:
Pictorial Technology 839
Universities' Independence ... 839
Freedom to Advertise 839
News Value 840
BR Research 840
The 1949 Year Book 840
Brotherton's Reorganisation ... 841
Trading Controls Revoked 841
Transport Lighting Regulations ... 841
Purchase Tax Exemptions 842
Token Imports Continued 842
Poland's Chemicals and Metals ... 842
£800 *M. for Chemical Industry* ... 843
Alleged Rubber Cartel 843
France's First Atomic Pile 843
Synthetic Petroleum Project ... 843
Industry in the German Bizone ... 844
DFDT: Potent German Compound Tested 844
Soviet Chemical Policy 845
Revised British Standards ... 846
Preventing Glass Decay 846
Hard-facing Electrodes 846
Indian Steel Scarcity 846
Chemical Fertilisers 847
Alleged Noxious Emission 847
I.C.I.'s New Copper Plant 847
Vinyl Chloride from Dichloroethane 848
New French Procedure for Sulphuric Anhydride 848
Sulphuric Acid Patents 849
Economic Acid Recovery 850
Electrolytic Saccharin 851
Potentialities of Powdered Rubber ... 852
Pozzolana Cements 853
Pakistan's Chemical Projects ... 855
Technical Supplies and Services ... 857
Widening Scope of Nylon and Rayon 858
Australian Distinction 860
Coconut Products 860
Prices of British Chemical Products 864

tive and valuable their services may be. Indeed, the whole theme of the Government case on steel, namely, that industrial organisation, even when controlled by a public body such as the Iron and Steel Board, is not 'safe' and that control must be combined with ownership to be satisfactory proves far too much. It certainly cuts at the very basis of broad industrial planning by the Government and destroys any confidence there may have been that there can be a satisfactory basis of co-operation between Government and industry."

The foregoing represents the well considered views of those who have long been responsible for the fortunes of the steel industry; their reconstruction of the course of events associated with the presentation of the Iron and Steel Bill is clearly worthy of being studied, perhaps especially at the moment by the spokesmen of the chemical industries.

That, it is worth noting, is also the belief expressed in a recent leading article in *The Financial Times* (December 18), which, although based largely on speculation, calls attention to a number of portents of which responsible opinion in chemical industry cannot be unaware.

"Memories need not be long," *The Financial Times* observes, "to recall a pamphlet entitled 'Public Ownership—the Next Step,' which was circulated to local branches of the Labour Party last March. This dealt with the possible nationalisation policy of the Party at the next General Election. It suggested that the Party should select its victims from among industries which were one—and particularly those which were more than one—of the following:—

"(1) Basic industries such as steel and chemicals. (2) Monopolised by a trust or trusts. (3) Inefficient because they were unable to find finance for development, or split into units too small for economic co-operation. (4) Investors of capital on a large scale. (5) Suffering from bad industrial relations."

The article wisely absolves chemical industries from the criticisms implicit in clauses 3 and 5 of the Labour Party's blueprint, but notes that in a broadside discharge such as this some shots will find targets. "It can hardly be questioned," it says, "that the chemical industry in many ways answers to the Labour Party's description of the ideal patient on which to conduct experiments in nationalisation. . . Suspicion of (the Government's) intentions must continue, even after the Government has come into possession of the comprehensive survey it has requested of the industry's plans and probable lines of development."

NOTES AND COMMENTS

Pictorial Technology

ONE of the most promising approaches to the heavily canvassed problem of providing the right kind of technical education in industry—especially in applied chemical industry—is being offered by the film meetings of the Institute of Chemical Engineers. These are only one aspect of an enterprising programme of works visits, debates and similar practical introductions to the hard facts of chemical production and economics which the institute is offering. An excellent topical example was their presentation a few days ago of a cinematograph review of the increasingly important oil refining industry, dealing with octane number and cracking. Development of engines of increasingly high compression ratios and the generally increasing demand for petrol have combined to spur on work on cracking of the heavy fractions from petroleum. Structures of the cracked molecular fragments were shown to be similar to those of "natural" (straight distilled) petrols of good anti-knock properties. Few among that audience may have gained much solid technical information, but the purposes of such films are rather wider than that. Such enterprising policy calls for a specialised technique and particularly for safeguards against ambiguity of any kind, since photographic portrayal admits no "questions and answers." One stage in the film presentation of oil cracking processes shows molecular models fading into vague elongated bacillus-like shapes. In the absence of explanation these essays in surrealism are dangerous food for beginners, who might be tempted to see these abstract forms as the physical representation of molecules. The subject is sufficiently complicated without exchanging identities.

Universities' Independence

A REASSURING view of a subject about which it is evident there is a good deal of apprehension is taken by Sir Richard Livingstone, President of Corpus Christi College, Oxford. His confidence that universities need not anticipate they will be "much troubled by State interference," notwithstanding the greatly widened Government interest, financial and otherwise, in their affairs, may be envied by some who take a less buoyant view of possible results of the very much closer relationship being built up here and in related spheres, especially in the realm of science. Such a warning seemed to have been implicit in Sir Robert Robinson's recent advice to Royal Society members to consider well the possible outcome of more intimate integration of science and the State—any State. The Archbishop of York, presiding at the dinner of the York and District Branch of the Oxford Society, at which Sir Richard Livingstone voiced his belief that public opinion would ensure that universities would be left to do their business by themselves, clearly has discerned a similar cloud on the horizon. He foresaw that the enlarged grants now being made by the Government to the Universities, welcome as they were, might have an affinity with the Trojan horse. "Some of us feel just a shade of anxiety," he said, "lest the grants should in any way interfere with the freedom of the universities." That manifestly was not an overstatement of the feeling widely held, which the policy of the Lord President of the Council (Mr. Herbert Morrison) as revealed so far has not allayed.

Freedom to Advertise

SEVERAL circumstances have combined in the past few days to promote a more realistic and balanced outlook on the subject of advertising, which Government policy of late seems to have conspired to place under a cloud. It is certainly not a gross exaggeration to say that the impression has been fostered that to use Press advertising on a normal scale was, however, slightly improper, even perhaps not quite patriotic. Government "pep talks" on the hoardings were quite another matter. Now, after full experiment with "controlled" advertising expenditures, even the Government, it appears, has recognised that the only competent authority to decide when to advertise, and to what extent is the advertiser himself. On and after March 7 next year the advertiser will accordingly be permitted to resume his familiar responsibility of deciding how much it would be

profitable for his undertaking to spend on advertising, without official limitations. The principle of voluntary limitation will remain, although immoderation in advertising is not a contemporary failing and there are ample safeguards, notably paper shortage, to ensure that it does not become so. The simultaneous appointment by the International Chamber of Commerce of a council to ensure that its Code of Standards of Advertising Practice is effective may be taken as further evidence that the commercial community is competent to regulate its own affairs.

News Value

THE foregoing is the broad view, of which there are specialised aspects equally worth considering, such as the point of view expressed by Mr. Geoffrey A. Shires, one of the Dunlop Rubber Company's research people at Fort Dunlop. He reminded the Association of Special Libraries and Information Bureaux, meeting in London, that anything up to 80 per cent of a technical journal to-day consisted of advertisements and those advertising pages were a legitimate quarrying ground for an information service. Details of plant or apparatus, he pointed out, might be as important as a piece of scientific investigation: with some products, where fashion or stock changed fairly often, advertisements became one of the few instances where technical information really justified "hot" service.

BR Research

THE importance of the contribution to the widening of scientific knowledge made by the chemical and physical laboratories of the railway companies is perhaps not fully appreciated. From Glasgow in the north to Ashford in the south, railway chemists must be prepared to cope with the 101 problems that arise out of the diversity of the railways' services to the public and industry. In an admirable lecture at the Northern Polytechnic, in London recently, Mr. W. P. Henderson, chief chemist, London Midland Region of British Railways, emphasised this importance. It seems all the more regrettable therefore, that, while the decision to bring all the railway systems under unified control was taken long ago, nothing seems to have been settled about the future of their chemical research—or if it has those on whom that work depends have not been told. Replying to a CHEMICAL AGE representative, Mr. Henderson said he did not know whether there would be further centralisation, though he believed it was under consideration. His own opinion, which many will share, was that it was not satisfactory to centralise to the fullest extent, and that, with the variety of research involved, it was more appropriate to deal in areas. Here is the considered verdict of an expert, and as such it might well be borne in mind by the authorities.

The 1949 Year Book

ATTIRED once again in the red covers with which subscribers were familiar in the past, THE CHEMICAL AGE YEAR BOOK, 1949, is now being despatched to representatives of chemical and related industries throughout the country and overseas. It is hoped that most of the copies of this basic work of reference to chemical industries and authorities, supplies, statistics, bibliography and commercial affairs will have reached subscribers at an appropriate season, when the eve of Christmas and the imminence of another year make most acceptable the arrival of an object of use throughout the succeeding 12 months. While the revised text of the 1949 Year Book covers 21 separate aspects of chemical affairs, the value as a whole of a publication such as this derives a great deal from the Buyers' Guide, extending this year to 42 pp. of classified information about supplies and suppliers, the need for which is constantly evidenced by the frequency with which requests for such information are received by THE CHEMICAL AGE. The wide changes in scope and direction of industries during and since the war and the arrival of a number of new materials and new requirements render a liaison service of this kind indispensable, and the very full complement of advertising pages, this year making liberal use of decorative colour effects, helps to make this a comprehensive and detailed guide. There remains, however, one stubborn supply problem to which the Year Book itself has no answer—that of paper supplies, the insufficiency of which is the reason why the distribution of copies in the United Kingdom is limited to subscribers to THE CHEMICAL AGE.

Trading Controls Revoked

Dyestuffs and Potash Chemicals

THE removal of trading controls imposed by the Government on two important categories of chemical materials has been announced by the Board of Trade, implementing the proposed relaxations mentioned by the President of the Board of Trade last month.

The first relates to the Control of Dyestuffs orders which prohibit the sale and supply of dyestuffs and intermediates except under licence by the Board of Trade. These orders are: S.R. & O. 1939 (No. 1431); S.R. & O. 1940 (No. 1836); S.R. & O. 1941 (No. 171).

The new revocation order, Raw Materials (Various Controls) (Revocation) (No. 2) Order, 1948, does not affect the regulations governing the import and export of dyestuffs and intermediates, for which licences are still required. It will come into operation on January 1, 1949.

Potash

Two Government orders which prohibit the acquisition, disposal and use of caustic potash and carbonate of potash except under licence granted by the Board of Trade are also being revoked. The orders are S.R. & O. 1941 (No. 55) and S.R. and O. 1941 (No. 931).

After the revocation order comes into operation on January 1, 1949, consumers' licences will no longer be required. All other arrangements governing imports, exports, methods of distribution and prices will continue as before.

[Note.—These are two of the relaxations of controls, already announced by the President of the Board of Trade on November 4. The Revocation Order gives Statutory effect to these relaxations.]

Transport Lighting Regulations

The Traders' Road Transport Association, the national organisation for C licence-operators, points out through its "Monthly Bulletin" that after January 1, 1949, passlamps and other permanently-dipped headlights must be fitted so that the centre is at least 2 ft. from the ground. After that date passlamps less than 2 ft. from the ground may be used only in fog or when snow is falling. All passlamps— and similar lamps—should point downwards so that they are incapable of dazzling any person more than 25 ft. away whose eye level is not less than 3¼ ft. from the ground. There are several other anti-dazzle requirements affecting ordinary headlamps and sidelights.

Brotherton's Reorganisation

Large Re-Allocation of Capital Proposed

THE 70-years-old firm of chemical manufacturers, Brotherton & Co., Ltd., Leeds, which is among the largest individual firms of its kind, is to be divided into a public company of the same name to take over the chemical undertaking with a capital of £1,275,000, and a private investment trust, to be controlled by the Brotherton family, with a capital of £1,475,000. This is the effect of proposals published last week.

Public Shares

The Capital Issues Committee has already given its consent to the scheme, and if the High Court's sanction to the reorganisation is obtained, it is intended to make application to the London Stock Exchange for permission to deal in the ordinary shares of the public company.

The new companies will be entirely independent of each other, and their total capital will be equal to the issued capital of the present company. In the new public company of Brotherton & Co., Ltd., it is proposed to issue 250,000, 6 per cent cumulative preference shares of £1 each, and 2,050,000 ordinary shares of 10s. each. The private investment trust is to consist of 450,000 4 per cent preference shares of £1 each, and 2,050,000 ordinary shares of 10s. each.

For each £1 of stock of the present company now held, stockholders will receive: 6 per cent preference—one 6 per cent share of £1 in the new Brotherton & Co., Ltd.; 4 per cent preference—one 4 per cent preference share of £1 in the new investment trust; ordinary stock—one ordinary share of 10s. in each of the two new companies.

Family Concern

The building up of the great organisation of Brotherton & Co., Ltd., is a notable example of the success of a family concern, and the passing of its personal element will be regretted. The new status, however, will no doubt afford more flexible conditions for full capitalisation to cope with the currently largely increased costs of plant replacements in a progressive business.

The business was founded on September 1, 1878, when the late Mr. Edward Brotherton—afterwards Lord Brotherton—at the age of 22 established works at Wakefield for the manufacture of sulphate of ammonia.

There followed the opening of a small works at Leeds, and later plants at Birmingham, Stourton (Leeds), Glasgow, Sunderland, Litherland (Liverpool) and Workington. Mr. Charles Brotherton is the present chairman.

Purchase Tax Exemptions

Additions to the Drugs and Medicines Schedules

THE Treasury has made under Sections 21 and 22 of the Finance Act, 1948, the Purchase Tax (No. 5) Order, 1948, which re-enacts, with additions, the list of essential drugs and medicines (not proprietary preparations) which are exempt from Purchase Tax.

All drugs previously exempt under the revoked Purchase Tax No. 1 Order remain exempt and any entries in the old list of exempt drugs and medicines which no longer appear in the schedule to the new order have been assimilated into more comprehensive entries.

The order applies to goods which are delivered or appropriated for retail sale by a registered manufacturer or wholesaler on or after December 15, or which are entered with the Customs or delivered from bonded warehouse by the same date.

The new additions to the schedule of drugs exempt from purchase tax are these :—

HEAD I

Acetarsol, salts and preparations containing not less than *six* per cent by weight of acetarsol.

HEAD II

Acetylcholine, acetyl-beta-methylcholine, and salts thereof; aluminium hydroxide; ascaridole; 4-cyclohexyl-3-ethyl-1 : 2 : 4-triazole; dehydrocholic acid and its sodium salt; di-(2-chloroethyl)methylamine and tri-(2-chloroethyl)amine, and salts thereof; n-diethylaminoethyl-thiodiphenylamine, and salts thereof; 1-diethylcarbamyl-4-methyl-piperazine, and salts thereof; 5 : 7 di-iodo-8-hydroxyquinoline; di-isopropylfluorophosphonate; 2 : 3-dimercaptopropanol; Russell's viper venom, prepared for use as a haemostatic; stilbamidine and other diamidines of diphenyl or diphenoxy derivatives of aliphatic hydrocarbons whether substituted or not, and salts thereof; tetraethylammonium halides; tetraethylpyrophosphate; tetraethylthiuram monosulphide, and preparations containing not less than 25 per cent of tetraethylthiuram monosulphide; triphenylchloroethylene; yellow bone marrow concentrate.

HEAD III

Suspensions with pectin and kaolin of *p*-aminobenzenesulphonamide, salts of *p*-aminobenzenesulphonamide, derivatives of *p*-aminobenzenesulphonamide having any of the hydrogen atoms of the *p*-amino group or of the sulphonamide group substituted by another radical.

Benzilyl oxyethyldimethylethylammonium salts; benzyl benzoate, and preparations containing not less than 10 per cent of benzyl benzoate; chloroform (anaesthetic); serum gonadotrophin; 4 : 4-diphenyl-6-morpholinoheptane-3-one, and salts thereof; ether (anaesthetic); preparations of the following glands: parathyroid, thyroid, pituitary, suprarenal, ovary, testis, spleen, corpus luteum, prostate, pancreas; glycosides of digitalis; homatropine, and salts thereof; hyoscyamine, and salts thereof; lobeline, and salts thereof; organo-mercury compounds; pilocarpine, and salts thereof; physotigmine, and salts thereof; sodium *p*-glycolyl arsanilate; sodium propionate, with or without terpineol; sparteine, and salts thereof; trichloroethylene, whether with or without a stabiliser or a colouring agent; vinyl ether; the anti-microbial substances, or salts thereof, produced by the growth of *bacillus polymyxa* on a suitable medium.

The following substances, and their salts and derivatives :—Anti-histamine substances, being tetra substituted N derivatives of ethylene diamine; beta-dimethylaminoethyl-benzhydryl-ether; 2-phenyl-benzyl aminomethylimidazoline; alpha-(3 : 4-dihydroxyphenyl)-beta-isopropylamine ethanol; 5^1-di-(n-butyl)amino-methyl-4 : 5 : 6-trihydroxy-benzo-(1 : 2-c)-furan-$1^{(3^1)}$-one; n-dimethylaminoethyl-n-p-methyox-benzyl-alpha-amino-pyridine; n-(beta-dimethylamino-beta-methyl-ethyl)-thiodiphenylamine.

The glycoside formed by the combination of 5 : 7 : 3^1 : 4^1-tetrahydroxyflavonal with glucose and rhamnose.

HEAD V

Therapeutic substances intended to be used solely for veterinary purposes, if prepared for use by injection or by application to the scarified skin.

(Sera and antitoxins) :— Anti-black-disease serum; anti-canine-distemper serum; anti-haemorrhage-septicaemia serum; Clostr.dium pyog.nes serum; mixed or polyvalent sera whose components are exempt from tax; pregnant mares' serum.

(Vaccines) :—Black disease vaccine; contagious pustular dermatitis (Orf) vaccine; haemorrhage septicaemia vaccine; leptospira vaccine; canine distemper prophylactics—Method I vaccine and virus, Method II virus and serum.

TOKEN IMPORTS CONTINUED

THE Board of Trade announces that the Token Import Scheme in 1949 will continue on the same basis as 1948. The annual quota will remain 20 per cent by value of each individual manufacturers' average trade in 1936/38 with the United Kingdom in the commodity concerned. Participating countries are: Australia, Belgium and Luxembourg, Canada, Denmark, Finland, France, Holland, India, Italy, Norway, Pakistan, Sweden, Switzerland and U.S.A.

Chemical materials embraced by the scheme include: Paints and varnishes, bone black, porcelain enamel frit, proprietary medicinal preparations, petroleum jelly, preparations, non-liquid shampoos (not more than 1 oz containers), laundry soap, sporting cartridges (loaded and empty), sporting powder, fuses and detonators.

Poland's Chemicals and Metals

Referring to the item in THE CHEMICAL AGE, September 25, "Poland's Chemicals and Metal Trading Groups," C.I.E.C.H. (Centrala Importowo-Exportowa Chemikalii i Aparatury Chemisznej) Ul. Jasna 10, Warsaw, has asked us to state that the Polish export of zinc white, red lead and gleit (litharge) is carried on by them and not by the Combine of the Non-Ferrous Metal Industry, Katowice.

£800 M. for Chemicals

Government's Four-Year Programme

THE provision for capital expansions of the United Kingdom's chemical industry at the rate of £200 million a year for the next four years is contemplated in the Government's economic programme, which was submitted to the Organisation for European Economic Co-operation and has now been published as a White Paper (Cmd. 7572, HMSO, 1s. 3d.)

Replacing Imports

The official forecast anticipates that by 1952 some £800 million will have been spent on chemical expansion in this country, with the object chiefly of retaining here the £60-70 million spent annually on chemical imports; and, as a secondary objective, to raise chemical exports to some 90 per cent above the 1938 level.

Iron and steel production, according to the Government view, will provide 17,020,000 metric tons of crude steel annually by 1952 (11,437,000 metric tons average in 1935-38).

In assessing the comparative value of the £800 million estimated to be required by the chemical industry, it is of interest that Imperial Chemical Industries' estimate of its own future expenditure, although not within the same period, is £130 million. For re-equipping the coal industry £600 million is expected to be required by 1952.

ALLEGED RUBBER CARTEL

THE U.S. Department of Justice has announced that it has filed a suit to break up an alleged world cartel in natural rubber products. The complaint named as defendants the Dunlop Rubber Co., Ltd., London, the Consolidated Rubber Manufacturers, Ltd., of New York City and London, and the United States Rubber Co., of New York City. The three firms are charged with conspiring with 13 foreign firms to divide the world's markets for the sale of rubber products.

It is alleged that the 16 firms formed a cartel, each agreeing not to sell or ship certain rubber products to a territory allotted to other members, and established a world-wide patent pool. As a result, it is alleged, competition among the defendants had been eliminated throughout the markets of the world, and exports and imports of the U.S.A. were restricted.

The complaint says that while the war and disturbed world conditions had caused some minor alterations in the working of the cartel, the basic arrangements had continued, state Reuter and B.U.P. reports.

France's First Atomic Pile

Experimental Operation Near Paris

THE French Atomic Energy Commission announced last week that the first French atomic pile had been set in operation. This small experimental construction is situated at the Fort de Chatillon, a fortress on the southern outskirts of Paris. The headquarters of the French Atomic Research Department there states that at the first test the pile of uranium and heavy water developed a strength of several watts. At full working strength its power was expected to reach several kW. The statement added that the pile was constructed principally as an experiment, to give experience to technicians and resolve problems in the construction of piles of greater strength. It would, however, produce artificial radio-elements, employed in hospitals and laboratories.

SYNTHETIC PETROLEUM PROJECT

WITH the intention of constructing plants at different places near the coalfields of Bihar and Bengal for the synthetic production of petroleum and products the Government of India has asked the coal industry whether the additional quantity of about 10 to 12 million tons annually of inferior grade coal can be produced by the existing collieries within five years, the period by which the plan may be put into operation. The Government has indicated it may be willing to provide finance and equipment.

The industry is stated to have signified its willingness to provide this quantity of inferior grade coal from the existing units if the Government removes certain obstacles and assures the mines will not be nationalised within a reasonable period.

The location of the plants is likely to be near Dishergarh Telaiya and Sindri where coal and water required for their operation can be had in abundance.

Caustic Soda from Seawater

To help relieve the serious shortage of caustic soda in Japan, the Teikoku Rayon Company is conducting a programme of research for production by direct electrolysis of seawater, according to the U.S. Department of Commerce.

Eight small electrolysers installed at the company's Iwakuri mill, Yamaguchi Prefecture, are reported to be producing about 15 kg. daily of 99.8 per cent pure caustic. The alkali is recovered at 15 to 20 per cent concentration; chlorine and bromine are obtained as co-products.

Industry in the German Bizone

Power Shortage Reduces Chemical Output

THE principal industrial problem in the bizonal area during the month of October was the increasing burden on already overtaxed facilities for generating electric power. Chemicals were the industry most adversely affected, but nevertheless production as a whole has been almost constant for three months since the rise which followed the currency reform.

Level Maintained

In the *Monthly Report of the Control Commission for Germany (British Element)*, Vol. 3, No. 10, October, 1948, the index for the chemical industry is given as 68 per cent of the 1936 level in August, 70 per cent in September, and 68 per cent in October. Basic chemicals varied only slightly from September the fall of 9500 in calcium carbide being due to drastic power cuts in Land Nordrhein-Westfalen and shortage of hydro-electric power in Land Bayern.

Caustic soda and chlorine production remained practically unchanged, but soda ash dropped slightly to 33,500 tons.

Commodities which showed a rise in output during the month under review were: sulphuric acid; primary nitrogen; phosphates (excluding ground phosphate rock); paint, varnish and lacquer; soap and washing powders.

Among the non-ferrous metals smelter production of copper, lead, and zinc rose during October. As was anticipated, aluminium output fell to 890 metric tons due to power shortage, and a further reduction in November seemed unavoidable.

Production of electrolytic copper, zinc (including zinc dust), and hard and soft lead all showed small but satisfactory increases.

The Nord-Deutsche Affinerie, Hamburg, most important bizonal producer of electrolytic copper, has negotiated a processing contract with Norway to refine 2606 tons of blister crude copper, 4000 tons of copper concentrates and 9000 tons of matte (an intermediate smelter product), with the proviso that all copper be returned to Norway. The contract will benefit the bizonal economy mainly because processing the sulphur-bearing Norwegian matte permits domestic matte, which is poor in sulphur to be processed.

Iron and steel production continued to increase and now stands at 51 per cent of the 1936 level. In the course of the past five months of rapidly rising crude steel production, there has been a tendency towards lack of balance between pig iron and ingot steel on the one hand, and finished steel products on the other. Both Allied and German authorities concerned with steel production are studying this problem.

Increased Output

October showed a rise in nearly all consumer goods. The principal items were: Glass and ceramics which reached 97 per cent of the 1936 level; sawmills and woodworking 74 per cent; stones and earths 89 per cent, and leather and leather products 67 per cent.

DFDT: U.S. Report on German Insecticide

AN insecticide used by the Germans during the war has recently been carefully studied in America, and Dr. W. T. Sumerford, chemist in charge of the technical development division, Communicable Disease Centre of the United States Public Health Service at Savannah, Georgia, gave a report on it in his address to the fourth annual general south-west regional meeting of the American Chemical Society at Shreveport, Louisiana.

The compound, Di-fluoro diphenyi-trichloroethane, which has become known as DFDT, is a low-melting white solid, with a slight odour resembling that of ripe apples.

DFDT does not, the doctor stated, possess the broad killing powers of DDT towards all insects, but has proved more potent against flying insects, particularly house flies. It can be prepared by condensing chloral and fluorobenzene in the presence of sulphuric acid or chlorosulphonic acid. Best results are obtained at a temperature around that of melting ice.

The more common chloral hydrate and commercially important chloral alcoholate can be substituted for chloral in the reaction, but the yields are not so good under the usual conditions for carrying out the condensation.

Purification of DFDT can be accomplished by the use of certain solvents, but quite good biological kills were obtained with the crude DFDT after it had been removed from the reaction flask and washed once with a weak alkali.

Like DDT, the new compound is extremely insoluble in water, but far more soluble in a variety of solvents including kerosene, xylene, edible fats and oils.

SOVIET CHEMICAL POLICY

Exploiting German Sources of Fuel and Fertilisers

RELIABLE information is scanty regarding the fate in recent months of those parts of Germany's great chemical capacity which have remained under U.S.S.R. control. A substantial part is known to have been transported to Soviet territory either piecemeal or in some instances as whole undertakings and there is no indication that the Russian policy of confiscating large proportions of output of all basic chemical products, as reparations or otherwise, has been relaxed.

Recent reports, however, indicate that the great Leuna works, near Merseburg, formerly the largest single unit of I. G. Farbenindustrie and now treated as Soviet property, is in a position to make a large contribution to the supplies of artificial fertilisers within the Soviet economy.

Although the works suffered devastation in the course of the war, the reconstruction since achieved is demonstrated by the fact that the works is now credited with employing as many as 23,000 persons. New workers' settlements have been established in the vicinity of the works to accommodate those rendered homeless through bombing and, by adoption of the principle of equal pay for equal work, some 4000 female workers are paid the same wages as men provided that they are engaged on "typically male work." Employment is given to some 500 invalids, and under a promotion scheme promising persons are given further education at Halle University.

Leuna Works Output

The Leuna works had been famous for the large-scale production of synthetic fuel according to the Bergius hydrogenation process taken up in 1927. No synthetic oil is, however, at present being produced because the acute shortage of fertilisers has necessitated a complete change in the manufacturing programme, although the production of nitrogenous fertilisers was no new departure. It started in 1917 employing the Haber-Bosch process. In 1939 the Leuna works was reported to have contributed one-third of the total German chemical fertiliser supply. Present output, important as it is to Eastern Germany, has by no means yet reached its former magnitude.

Russia can in fact dispense with the former synthetic fuel output at Leuna because it has at its disposal a number of hydrogenation works. There is, for instance, the Lützendorf plant near Merseburg, which now employs some 4500 workers, the Winterhall plant, with about 2000 workers, the Schwarzheide unit, 3800 workers, and the plant at Zeitz, which employs no less than 7000, and the Brabag (Braunkohle-Benzin A.G.) at Magdeburg, which is reported to have several thousand on its payroll.

Liquid Fuel Supply

Further hydrogenation plants are operating at Böhlen, Deuben, Köpsen and Rositz. Although most of these are said to be in full operation, the liquid fuel supply position of the Russian zone is deteriorating because the bulk of the output is being shipped to Russia. The needs of the occupation army are of course also being met from local output.

A report from the special correspondent of *The Times*, at Essen, states that the Borbeck open-hearth smelting installations and steel-rolling mills at the Krupps works there, which were relatively undamaged in the war, have now been totally dismantled by the Russians, and the last pieces of equipment will be shipped to Russia by way of the Mediterranean early in January.

The Borbeck plant is stated to be the most modern of its kind in Europe. It was built after the 1914-18 war and started production in May, 1929. It was granted to the Soviet Union by the other main Powers late in 1945.

The first large-scale allocation of equipment from the Krupps works to countries making bids under the Inter-Allied Reparations Agency in Brussels has just been made to Jugoslavia. The equipment consists of a gigantic forging press of 15,000 tons strain, believed to be the biggest in Europe.

LARGEST MANUFACTURER IN GERMANY

MR. Charles Luckman, president of the American branch of Lever Brothers, on his return to the U.S.A. after visiting Germany, claims that the combine is now the largest manufacturing organisation in Germany.

Shortage of raw materials, which must all be obtained through the Allied Military Government was, said Mr. Luckman, the reason why Lever Brothers' 54 plants in Germany were operating only at about 80 per cent of capacity. In addition to chemical plant, their activities in that country included textile manufacturing, margarine, perfume, cosmetics, plywood and their products.

Revised British Standards

Casein Glue, Tallow and Bone Grease

THE following revised standard specifications have been issued by the British Standards Institution.

BSS 1444 : 1948, cold-setting casein glue for wood, which supersedes BS4V2, casein glue for aircraft purposes. The standard provides for glues which have a limited degree of water resistance, as well as those for which no such resistance is claimed. Tests are laid down for both types (2s. post paid).

Two other standards issued have been approved by the Oils, Fats, Greases (other than Petroleum and Tar and Soaps) Industry Standards Committee.

BSS 1282 : 1948, home-produced technical tallow, defines this material in terms of its origin and general chemical characteristics, and provides details of preparing the sample for examination; the determination of the colour of soap, volatile matter, solvent, organic dirt, ash content, free fatty acids, iodine value, unsaponifiable matter, molecular weight and titre. Detailed notes are provided on the chemistry of the product and temporary relaxations in respect of iodine value and titre are permitted in view of present conditions (2s. 6d.).

BSS 1483 : 1948, defines bone grease in the same terms and conditions as above (2s. 6d.).

Copies of these specifications can be obtained from the British Standards Institution (Sales Department), 24 Victoria Street, London, S.W.1.

PREVENTING GLASS DECAY

A METHOD of preserving old glass was recently presented by Prof. Arvid Hedvall, of Gothenburg, at the annual meeting of the Swedish Academy of Engineering Sciences.

The professor had verified that the chief cause of disintegration of glass is crystallisation and also by reactions between the calcium compounds and alkali of the glass with the water and carbon dioxide of the air. Prof. Hedvall's method comprised two stages: the evacuation of the glass to remove enclosed or dissolved gases, and the application of a special plastic compound which is absorbed by cracks and cavities and seals the glass against air and moisture.

Investigation also showed possible means of treating other ageing materials such as tin, bronze and steel, and methods of dealing with the cracking of old oil paintings.

Safety matches will shortly be manufactured in a factory now being equipped by a recently-formed company near Cape Town.

Hard-Facing Electrodes

Two New Types Available

TWO new electrodes known experimentally as BN21 and CB5, have, after extensive trials, been included in the list of established, hard-facing electrodes supplied by Murex Welding Processes, Ltd.

BN21, now known as Hardex OHR, yields a corrosion and heat-resisting deposit specifically designed for hard-facing parts exposed to abrasion at high temperatures, such as the facing of coke oven pusher rods, subjected to approximately 1100°C.

CB5, listed officially as Hardex 800, is used for applications on mild or medium steel machine parts and tools and meets the demand for maximum hardness in the as-welded condition—the high figure of 800 VPN being obtainable.

Murex has taken this opportunity of revising the nomenclature of its standard hard-facing types. All bear the generic name of Hardex, followed either by a number, indicating the typical hardness on mild steel in VPN, or by letters showing the particular property or application. The following list gives the new name, with the former appellation in parentheses: Hardex 250 (Rolex 2); Hardex 350 (Rolex 3); Hardex 650 (Hard Surfacing); Hardex 800 (CB5); Hardex OHR (BN21); Hardex T (Hardex).

INDIAN STEEL SCARCITY

TOTAL steel production in India during the quarter July-September this year was 211,050 tons. The production figures for the first two quarters of the year were 224,600 tons and 201,700 tons respectively.

The decline in the two quarters is attributed to breakdown of machinery of the S.C.O.B. undertaking, which has resumed normal production from September. The production for this year will be 825,000 tons, it is estimated, a figure which compares unfavourably with the production figure for 1947, a year of universal underproduction, which was 868,580.

The need existing in India at present being 2.5 million tons of steel, double the present capacity and treble the actual production, the Government has been for some time past confronted with the problem of importing as much steel as possible with the limited foreign exchange resources available.

India has to depend mainly on the United States of America and the United Kingdom for her imports though there is evidence of their availability to some extent from Canada and Belgium.

Alleged Noxious Emission

Medical Research Council to Report

THE prospect of far-reaching action resulting from the legal process in Edinburgh relating to the North British Aluminium Co.'s activities was referred to by Lord Morrison in a written reply to a Parliamentary question by Viscount Stonehaven.

The questioner asked why publication of the report of the committee of the Medical Research Council investigating the case against the North British Aluminium Co., Ltd., Fort William (THE CHEMICAL AGE, December 11) had been so long delayed, when extracts were said to have been received by a certain local authority.

The report of the committee of the Medical Research Council, said Lord Morrison, which had been investigating the medical and veterinary aspects of the matter, had recently been completed.

Compilation Difficulties

Delay was to be attributed to the fact that there had been some difficulty in compiling and editing the report in its final form, as it is based on the contributions of a number of individual investigators. It was, however, now with the printers, and would be published in January.

The whole matter would be considered as urgent as soon as the legal action, at present before the Court of Session, had been determined.

FATAL FUMES

THE American Steel and Wire, a subsidiary of the United States Steel Corporation, discloses that plans have been completed for the re-opening of its Donora Zinc Works, Donora, Pennsylvania, which was closed voluntarily by the company on October 31, pending the outcome of the investigation by health authorities into the recent "smog" which was held responsible for the death of 20 Donora residents.

Health authorities have announced that continuing control measures have already been started in order to insure against recurrence. Samples of the atmosphere are being taken not only in Donora but in the entire general industrial area, at various times of the day under varying weather conditions. A constant check will be made, health authorities state. There will not be a repetition of this disaster, and there is every reason to believe that a spot check will indicate any build-up of atmosphere before harmful concentrations can be made.

Chemical Fertilisers

Western Europe's Production Rising

THE production of chemical fertilisers in Western Europe during 1948-49 is expected to be almost double the pre-war figure, states a report from the office of the U.S. special representative from ECA. During this period, ERP countries estimate that they will be able to produce 1,345,000 tons of nitrogen. Last year they produced 1,095,000 tons and in the 1935-38 period the total was 760,000 tons.

Estimated deliveries of phosphate rock from North Africa during 1948-49 will be 70 per cent higher than the 1935-38 average, and 10 per cent more than last year. A 29 per cent increase in potash production in Marshall Plan countries is expected.

Overproduction Foreseen

The possibility that the generally accepted view that current production of agricultural nitrogen will be much less than world demand may not be correct is raised in the annual report on the nitrogen industry by Aikman (London), Ltd.

This recalls that the FAO estimated total requirements for 1948-49 at 4.061 million tons compared with 3.62 million tons for 1947-48, when actual consumption, owing to shortage of supplies, was only 2.7 million tons. This estimate apparently included about 1 million tons for Asia, whereas allocations for this continent were only about half that quantity, and it is doubtful whether more could have been disposed of owing to lack of finance. World production during the current year is estimated by the FAO at 3.083 million tons and by Aikmans at 3.114 million. In addition, some 19,000 tons will be exported from Russia and the Russian zone of Korea, making 3.133 million tons available for world fertiliser consumption in 1948-49.

"It is probable," Aikman (London) state, "that larger quantities could have been consumed in the United States, Egypt, and certain European countries than their available supplies, but we do not believe more than 3.25 million tons could have been absorbed this year owing to the difficulties of arranging payment in foreign currencies for the imports that would have been required. This figure compares with the FAO estimate of 4.061 million tons, which in our opinion could never have been consumed unless long-term American credits had been given on a large scale."

Change of Address.—Protolite, Ltd. (a subsidiary of Murex, Ltd., of Rainham, Essex), advises that it has now removed to new offices at 144 St.. Vincent Street, Glasgow, C.2.

Vinyl Chloride from Dichloroethane

Experiments with a Pumice Catalyst at High Temperature

FURTHER light on the production of vinyl chloride by the dichloroethane method, which has been developed chiefly in the U.S.A. is contained in the results of experimental work by C. Rossi, of the Industrial Chemistry Institute, of Milan.

This is represented by a preliminary note (*La Chim. et l'Ind.*, 1948, *30*, 269-271) on work concerned chiefly with the use of a pumice catalyst, at relatively high temperatures, up to 630°C.

The reaction was endothermic and, in order to avoid the use of metal with possible catalytic disturbance, quartz apparatus was used. Comparative tests were also made with activated carbon, both fresh and used, at 350°C. Particular attention was paid to the rate of feed of dichloroethane in relation to the amount of catalyst.

Tabulated results show that with carbon, the reaction took place at the relatively low temperature of 250°. A rate of feed of dichloroethane above 500-600 g./hr. did not increase the yield of vinyl chloride which, in the carbon catalyst tests, ranged from 65.4 to 90.4 per cent calculated on the amount of dichloroethane reacted.

Raising the temperature with the used carbon catalyst gave rather poorer yields of vinyl chloride. Thus, at 500°C., with a feed in of 1550 g./hr., the yield of vinyl chloride was only 60 g./hr., while at 350°, and a feed of 600 g./hr., the yield was 130-140 g./hr.

Interesting results were obtained with pumice catalyst at higher temperatures. Its activity is attributed in part to adsorption of the HCl formed, and this activity was not lessened by some deposition of carbon on the catalyst. Percentage yields of calcium on dichloroethane reacting ranged from 75.5 to 90.

In one case at a temperature of 560°, and a feed rate of 37 g./hr., the percentage of dichloroethane reacting was 71.8 and the yield was 89.6 per cent. But the highest velocity of reaction was obtained at 630°, when, with a feed rate of 2210 g./hr., practically all the dichloroethane reacted and the yield was 90 per cent (1260 g./hr.).

The unique structure of the catalyst no doubt plays a very important part, and is the subject of further research. It certainly permits a much higher velocity of working and thus reduces the risk of secondary reactions. Immersing the catalysts in such solutions as chromium chloride had little effect. Secondary reactions will be reported in greater detail later.

Meantime, it can be said that, so far as the unreacting dichloroethane is concerned, this can usually be re-cycled without further treatment. The gaseous waste products (about 10-15 per cent) are mostly acetylene, ethylene, hydrogen, etc.

New French Procedure for Sulphuric Anhydride

ANOTHER recent foreign application for an English patent (No. 34094/1947, Conv. date September 17, 1945, by Fassina and Fassina, of Paris) describes the direct production of sulphuric anhydride (the trioxide) from pyrites. The iron sulphide mineral, such as pyrites, is reduced to a 100 mesh powder and an oxidising agent is added in approximately equal proportions in the form of finely powdered manganese sesquioxide (Mn_2O_3), with which a certain amount of impurity may be associated, *e.g.*, silica, as in braunite.

The mixture is heated in a rotating cylinder, first to about 400°C. and an air current is used to remove into suitable receivers arsenious, antimony or other impurities. The purified sulphurous gas passes into other receivers and the sulphur trioxide then combines with the Mn sesquioxide to form manganese sulphate. The furnace is then connected to receivers containing concentrated acid of 66°Bé, and the temperature is raised to 700°C., the sulphur trioxide vapours being absorbed.

If another oxidising agent is used, such as polianite, a somewhat different reaction takes place and manganese sulphate and ferric oxide are formed. One special application of the process is in the treatment of concentrates of arsenious auriferous pyrites.

Improved Pump Design

High speed pumps and gauges for continuous production purposes have in recent years become increasingly important in chemical, metallurgical and electronic industries. The Type 903A oil diffusion pump and combination baffle valve described in their latest catalogue by W. Edwards & Co. (London), Ltd., can utilise silicone, apiezon oil or other pump fluids. It is a three stage water-cooled pump with the special feature of an integral "booster-type" third stage.

SULPHURIC ACID PATENTS

Improved Italian Methods Claimed

AT the recent 21st Congress of Industrial Chemistry in Brussels, Guareschi read a paper on the constitution of high nitric sulpho-nitric acids used in intensive manufacture of sulphuric acid, and developed some new ideas on SO_2 oxidation. These included the formation of a persulphuric radicle in the sulpho-nitric molecule to catalyse the reaction. The composition of the nitrous atmosphere with a high N_2O_3 content is that of a compound which sets free large amounts of oxygen during the reaction. Some experimental results were adduced in support of this view.

These and other ideas have been embodied in several patent applications lodged during this year and last in this country, in the name of Guareschi and his associates, Maragliano-Busseti and others in Genoa.

The use of a nitrogen oxide to supply the necessary oxygen for conversion of SO_2 to SO_3 is of course a well known feature of one of the oldest methods of sulphuric acid manufacture: (*e.g.*, Newth's Inorgn. Chem., 1898 edit., pp. 387-390).

This particular reaction has also formed part at least of the basis for the combined manufacture of sulphuric and nitric acids as developed by Kachkaroff and others in Italy and France, and which formed the subject of a further paper by Salsas-Serra at the Brussels conference (THE CHEMICAL AGE, December 11).

Guareschi's English Patent

In his first English patent application No. 1506/1947 (Conv. date January 16, 1946, Italy), Guareschi claims an improved method for the production of oleum (SO_3 dissolved in conc. H_2SO_4) by catalysis, whereby plant and operation are simplified, considerable economy in cost and space is ensured, including, in particular, lower heat requirements. It is pointed out that one of the most serious difficulties hitherto has been to secure satisfactory absorption of the gaseous sulphuric anhydride (SO_3) in the acid, which usually required a large number of absorption towers, involving higher costs and greater expenditure of fuel to raise and maintain the required temperature of 450° for effective catalysis.

In the present invention the mixture of gases from the pyrites furnace (SO_2, O_2, N) is freed from impurities, such as As, H_2O, etc., in the usual way, and then either the SO_2 or all the constituents of the gas mixture are liquefied. If the SO_2 only is liquefied the oxygen may be separately treated. Or the constituents may be liquefied in sequence, beginning with the SO_2.

In either case the gas mixture is reduced to the form of $SO_2 + \frac{1}{2}O_2$, and is led into a heat recuperator attached to the pyrites furnace where temperature is raised to 450-480°C.

Owing to the high concentration of gas, catalytic reaction takes place with much better yield than usual.

Evaporating Liquefied Gases

The liquefied gases may be evaporated by causing them to expand in two heat recuperators which bring about preheating in countercurrent, simultaneously with precooling of gases coming from the furnace.

In the English patent No. 34960/1947 (Conv. date January 16, 1946) the claims are somewhat similar to those for oleum manufacture, but instead of the SO_3 being absorbed by the acid in a gaseous state it may be liquefied and solidified, and dissolved in this form in a mono-hydrated sulphuric acid (98 per cent), solution. In this way all bulky and costly plant parts, such as absorption towers, are eliminated.

English patent No. 35007/1947 (Conv. date June 26, 1939), in the name of G. Maragliano-Busseti and Lucia Pettenati, for the intensive manufacture of sulphuric acid, relates to a method in which nitrogen oxides are used as reaction accelerators.

The four stages in the usual process are: (a) formation of chamber sulphuric acid; (b) recovery of nitrogen oxides; (c) liberation of recovered nitrous products and return into cycle; and (d) acid concentration to about 60° Bé.

In the present invention sulphuric acid is formed simultaneously with the recovery of the nitrogen oxides liberated. The SO_2 is in closest contact with nitro-sulphonic acid (nitrosyl sulphate) dissolved in the sulphuric acid of over 60°Bé. As the reaction is at first very vigorous, nitrogen oxides are set free in bulk, and most are oxidised almost as soon as they are liberated.

Much of this is N_2O_3 and is absorbed, while NO or NO_2 in excess and not readily absorbed passes into the gaseous mixture. It is subsequently absorbed in the direction of the gas stream as N_2O_3 mixed with some NO. Thus, by suitably varying the amount of nitrosyl sulphate, the composition of the sulphurous gas mixture, and the temperature, the two phases become practically

(*Continued at foot of next page*)

Economic Acid Recovery

Patent Process Using a Common Waste Liquor

THE prospect of making profitable use of bulk quantities of waste sodium sulphate liquor for the production of sulphuric acid and common salt is held out by a process for which Krebs & Co., Ltd., Zurich, have filed a patent application here (E.P. 30216/46; Conv. date June 18, 1946). The process is based upon the familiar principle of heating sodium sulphate or bisulphate with hydrochloric acid.

It has been necessary hitherto to concentrate the acid formed to 70-75 per cent with complete removal of the HCl, and this adversely affected economic working.

It is now shown that solid sodium sulphate, *i.e.*, Glauber salt, or the bisulphate, can be treated direct with HCl with almost theoretical yield, forming the basis of a new process.

Glauber salt obtained by evaporation and crystallisation from the waste liquors is naturally of high purity, and yields at once a highly concentrated acid, from which therefore much less water has to be removed. It is also possible to use partially dehydrated sodium sulphate as the starting material.

The reaction takes place in a suitable acid-resistant container surrounded by a cooling jacket, in which gaseous HCl is passed with steady stirring. There is first a drop in temperature, and the mass begins to melt at about 8°C. without separation of anhydrous sulphate.

Further addition of HCl provokes strong heating and NaCl is slowly precipitated. The addition of HCl and stirring is continued, while the water is circulated through the cooling jacket and reaction products are cooled until the salt is completely precipitated. The residual liquor is separated by centrifuging or filtration and suction.

Alkali Chloride Electrolysis

After further washing with aqueous HCl and evaporation, sulphuric acid of 75 per cent concentration is obtained. Most of the HCl used is recovered as gas and passed back into cycle. This process can be combined with alkali chloride electrolysis in a continuous closed cycle. It is only necessary to replace small losses of HCl.

A second patent application by the same firm (No. 30217/1946, Conv. date June 25, 1946) claims to permit the simultaneous production of sulphuric acid, HCl and NaCl from sodium sulphate or bisulphate waste liquors by another method.

As soon as the solution has been sufficiently saturated with HCl, NaCl begins to precipitate, and can then be filtered off and collected. HCl formed in excess can also be separated from the sulphuric acid, and both acids obtained pure. In order to remove completely the HCl and any initial gas mixture, the sulphuric acid must be concentrated to at least 70 per cent. This, as in the previous case, also unfavourably affects the economy of the method.

It has now been found, as in the preceding patent, that the reaction can be carried out with solid sodium sulphate, and the sulphur dioxide can be replaced by elemental sulphur; or sulphur trioxide can be led in. A further variation is treatment of Glauber salt with HCl; the precipitated salt is filtered off and chlorine and sulphur dioxide passed in. Thus, both sulphuric and hydrochloric acids are formed, concentration of the former being at least 60 per cent without evaporation. Small losses of chlorine and sulphur dioxide must be replaced.

SULPHURIC ACID PATENTS

(*Continued from page* 849)

simultaneous and in much reduced volume.

The English patent No. 35008/1947 (Conv. date November 26, 1946—P. Guareschi, G. Maragliano-Busseti and Lucia Pettenati) is for the manufacture of sulphuric acid, in which special apparatus is more specifically claimed. One of the systems already used is described, with some modifications, consisting of parts: (a) denitrating tower of Glover type, fed on one side with nitrosyl sulphate—two of such towers may be worked in parallel; (b) several absorption towers filled with Raschig rings and working in series, the first of which receives from the denitrating tower a mixture of SO_2 and nitrogen oxides, while remaining towers receive mixture richer in nitrogen oxides; (c) one or more recovery towers. In such a system there is inter-dependence between the various parts.

The following advantages are claimed: (1) better control of plant; (2) arrangement in parallel of two Glovers with distinct functions; for the second tower makes the recovery towers independent of acid concentration, so that plant operation is much more elastic; (3) one of the Glover towers instead of being connected exclusively with the first production tower is connected in parallel with all the towers except the last one; (4) improved cooling arrangements; and (5) more compact plant.

ELECTROLYTIC SACCHARIN

Rumanian Reports of Purer Yields

ONE or two substantial improvements of existing practice of producing saccharin by electrolytic oxidation of *o*-toluene-sulphonamide are foreshadowed by recent work in Rumania by I. A. Antanasiu. He has lately reviewed the experience of some of his predecessors and presented his own findings in the *Bulletin* of the National Research Institute of Rumania (1948, *3*, 29-36).

The first patent for direct electrolytic oxidation was that of Haydens in 1895, using an alkaline bath (NaOH); followed by the method of Sebor in 1903 and by Fichter and Löwe's in 1922. In 1930, F. Halla studied variations in yield with an anode structure; and in a Dutch patent (No. 42,338, of 1937) a method was claimed using borax or an alkaline perborate solution (*p*H 12) and c.d. of 0.02-0.05/cm^2, whereby a saccharin concentration of 18 per cent is said to have been obtained.

Among these, Löwe's work is probably the most interesting (*Helv. chim. Acta.*, 1922, *5*, 60; English patent. 174,921) but his yields are said to have been low and variable, due to factors not mentioned in the patents.

Antanasiu now enumerates these as: electrolyte temperature, *o*-toluene-sulphonamide concentration of solution, purity, cathodic action of hydrogen, and the nature of the anode.

Preventing Anodic Oxidation

To obtain maximum yield it was found that the saccharin as formed must be protected against action of anodic oxygen and cathodic hydrogen, a matter of some difficulty, in view of the solubility of saccharin in alkaline medium. Fichter and Löwe had shown that there was no anodic oxidation of the saccharin so long as there was sufficient sulphonamide in solution to act as a depolariser more powerful than saccharin.

It has now been found that the requisite minimum of sulphonamide in solution is 2 per cent, and for this the temperature mentioned by Löwe (60°C.) must be raised to 75°C. Between that and 85° the yield ranges from 50 to 70 per cent, according to conditions of working and purity of material. With increased yield of saccharin the high temperature increases concentration of *o*-toluene-sulphonamide and prevents oxidation of saccharin.

Some results obtained by Halla at temperatures of 95-100°C. are recorded (*Z. Elektrochem.*, 1932, *36*, 96). Halla used with good results a gold anode, giving high over-voltage for oxygen in alkaline medium, while Löwe used a platinum anode. The latter, for various reasons, is preferable.

Antanasiu tried also iron, lead, or tin anodes, with negative results. Of these, the first two gave over-voltage (anodic) but this apparently is not the only factor to be considered, and catalytic action of the metal surface must also be taken into account.

In the present work a voltage of 9-12 was used, according to the extent of immersion of the cathode; and it is shown, despite what Löwe has recorded, that cathodic hydrogen can reduce saccharin in an alkaline medium. This was found also by the Japanese workers, Matsui *et al.* (*Mem. Coll. Sci. Kyoto Univers.*, 1932, (A)*15*, 161) using a lead cathode. Antanasiu avoided this by only slightly immersing the cathode, which allowed the hydrogen more readily to escape but considerably increased bath resistance and terminal voltage.

Time Factor

The period of electrolysis should be slightly longer than that required theoretically for oxidation deduced from Faraday's law, under normal conditions. Saccharin is a good anodic depolariser, and the anodic potential increases with time, so that for both these reasons oxidation of saccharin is increased. Another important factor is purity of the starting material; impurities produce various undesirable effects.

The best results were obtained with *o*-toluene-sulphonamide (*o*-sulphobenzimide) of m.p. 115°; only indifferent results were obtained with one of m.p. 148°. A short preliminary electrolytic oxidation was found useful. By cooling the solution, a product of greater purity was precipitated for use in the main electrolysis. But this purifying method involves some loss of material.

Saccharin obtained by electrolysis is purer than that produced chemically, but retains a slight wash-leather colour which is difficult to remove. Purification by crystallising the sodium salt may be effective.

Indirect electrolytic oxidation was tried for the first time by Halla (*loc. cit.*) in presence of sulphuric acid with permanganate or bichromate of potassium as oxidant; although, according to Löwe, this leads to oxidation of the sulpho group. It is better to describe the method as chemical oxidation followed by electrolytic recovery of the oxidant used. These can only take place in the same space or vessel if the rate of oxidation of sulphamide by the oxidant is greater than that of saccharin by anodic oxygen. With excess of sulphonamide this may be avoided.

Potentialities of Powdered Rubber

Revival of Interest and Investigation

by T. R. DAWSON, M.Sc., F.R.I.C., F.I.R.I.*

IN the mid 1930's there was very considerable activity in regard to the production of raw rubber in the form of a fine powder, centred mainly on the ill-starred Rubber Latex Poeder Cie, N.V. Many attractive applications were conceived and promised for such a product, but the whole matter faded away in the face of some economic or technical flaw in the powder production process.

Current Research

For a decade the question has languished, not because of any known failure in the suggested uses of rubber powder, but because no bulk supplies of powder were forthcoming. Comparatively recently there has been a considerable revival of interest in rubber powder, and there have been new investigations which merit attention.

The powder on which attention formerly was fixed was marketed under the name of "Pulvatex" by the company mentioned and its British offshoot, the Rubber Powder Co., Ltd. It was never completely certain which process was definitely used in its production, as the companies always had two methods under full discussion.

The newer powder, which figures prominently in the revival of interest, is known as "Mealorub," and comes from work of the West Java Proefstation. This powder is prepared from fresh field latex, vulcanised, flocculated, the floc collected by centrifuging, the cake dried and disintegrated.

"Pulvatex" powder is very free flowing, about 200 mesh. An expected advantage of easy mixing by simply stirring rubber powder with powdered ingredients did not materialise. Satisfactory mixings are obtained only by adding very considerable proportions of a fluxing agent such as naphthalene, or by strong mechanical grinding, which may consume more powder than sheet or crêpe, as in the case of Hopkinson spray-dried rubber.

The more recent "Mealorub" powder differs in many ways. The dry powder can be crêped easily on an ordinary rubber mill, and is sufficiently self-adherent, although vulcanised, to bond well together. It does not, however, easily accept plasticising agents to adust its consistency. When mixed as part of a normal vulcanisable stock with other raw rubber it vulcanises faster than usual and gives quite sound mechanical and ageing properties. Solutions can be obtained only at 150°C., and have no adhesiveness; at low temperatures the particles break up and form fine dispersions in the solvent.

Main interest in the current period of revived attention has come from the Rubber Stichting's important use of "Mealorub" in major road surfacing experiments. Other proposed uses fall mainly in the domain of using the powder as a raw material for chemical developments such as easier production of rubber derivatives, or possibly of rubber plastics. Not much has been done so far.

Many uses, on the other hand, were put forward for the raw rubber powder "Pulvatex," and failed to materialise only because there was no free supply of powder. Potential uses are well worth further consideration.

Fine rubber powder can easily be sprinkled, sprayed or otherwise applied as a rubber protective covering on all types of articles. Such coatings can be cold-cured, or if vulcanising agents are incorporated, can be moulded and heat-cured. Coatings resistant to corrosion or to shock and blows are readily suggested, with obvious possibilities for colouring and decorative effects.

The field of "compositions" naturally has few limitations, and rubber powder as a modifying agent, or as a bonding agent, presents many opportunities for useful effects. Direct mixing by simple stirring together of rubber powder and filler powders, pigments, fibres, etc., has not so far been successful, but it does not follow that simple mixing processes with the help of auxiliary agents, wetting or adhesive agents, will not eventually be discovered.

Pigmentation

Rubber powder also lends itself to numerous new decorative effects and finishes. It can be pigmented in a wide variety of colours, and rendered susceptible to taking varnishes and lacquers in different ways. There is also the possibility of treating the powder chemically to transform its *surface* only to derivatives with useful properties, thus offering surfaces that are resilient and rubbery, but of exceptional resistance.

It is, in fact, certain that once rubber powder is definitely available at reasonable price, there will be a decided volume of novel applications.

* From *Rubber Developments*, Vol. I, No. 6. December 1948, issued by the British Rubber Developments Board, Monk Lane, London, E.C.3.

POZZOLANA CEMENTS

Recent Results of Italian Research Programme

IN an attempt to clear up some of the difficulties arising from the wide differences of opinion regarding the underlying chemical or physical changes which take place during the manufacture or use of pozzolana cements, A Cereseto and A. Rio are undertaking, in the laboratories of the Soc. Ital. per la Poroduzione Calci e Cementi di Segni, Colleferro, near Rome, an extensive programme of research on these materials, in collaboration with various other scientific institutions, including universities, in Italy. In a preliminary article (*La Chim. e l'Ind.*, October, 1948, *30*, 261-4) they survey some of the theories and recent work in this field.*

Some of the controversy which centres around this subject appears to have arisen over Vicat's original hydraulicity index, or as it was later called by Lafuma, the chemical resistance index, the main uncertainty being the manner in which all the lime present or set free is absorbed. It seems, at all events, to be agreed that a pozzolana cement of good quality fixes all the free lime, possibly or mainly as hydrated monocalcium silicate, thus increasing stability and chemical resistance.

In any case, the present standard specifications in Italy stipulate that the amount of pozzolana present shall contain enough silica and alumina to take up all the lime present or set free during manufacture or use (in setting or hardening).

Principal Factors

In such specifications the chemical resistance index and insoluble residue are among the principal factors and limit the risk of adulteration. Vittori and Cereseto had earlier supported the view that hydraulic activity is largely governed by solubility, especially with leucitic pozzolanas (*La Chim. e l'Ind.*, 1935, *17*, 646), subject, however, to some exceptions. At that time the generally accepted theory was the formation of stable and resistant compounds between the lime freed by clinker hydrolysis and the acidic elements of the pozzolana constituent.

In recent years this view has been questioned, notably by German research, which attached considerable importance to zeolithic formation and action; that is to say, some sort of physical exchange between the lime and the pozzolanic elements. This is the view of, for example, Wittekind and Biehl, who studied the trass or tuff of the Rhine district by treatment of these with calcium nitrate solution and observation of lime movements and changes.

Other workers along similar lines were Tannhäuser, Steopoe, Sestini and Santarelli —the first two with German and the others with italian material (from Phlegra, Latium, etc.). These latter agreed that, although zeolithic action may take place, it is by no means a complete explanation.

Zeolithic Material

Still more recently Tavasci (*Il Cemento*, February, 1946, 28), in a petrographic study of the segni pozzolanas found evidence of zeolithic material, *e.g.*, constituents of the philipsite and cabasite type which are mainly calcic, while the sodium kind were absent; and subsequently (*loc. cit.*, June, 1947) he found hydrated tricalcium aluminate with 11-12 H_2O. Tavasci thinks there is not definite stable formation, but rather a series of compounds of variable composition, among which the hydrated calcium silicate probably predominates, similar to the natural di-silicate, okenite : $CaO, 2SiO_2, 2H_2O$.

The special significance of the lime/silica ratio has also been studied by many others, including Le Chatelier, Cirilli, Beitlich, Lea, and Buessem. There are also the mechanical effects of pozzolana in cements to be considered, *e.g.*, on density and permeability.

The complex changes taking place, therefore, especially in the setting and hardening process, may be of a threefold nature : mainly physical through particle size, surface action, etc.; chemico-physical; and essentially chemical in formation of lime-pozzolana compounds. It seems, then, that the lime may be chemically combined and also physically held by surface adsorption.

Chemical Resistance

Although the predominating action may be that of a solubilising nature between the lime and acidic elements, and may partly explain the course of the hardening curve, it does not altogether account for the high chemical resistance of these cements. In this connection the views of Ferrari (no reference) and Steopoe are cited, including the assumption of a protective film, with hydrosilicates as the essential constituents.

Under the action of aggressive liquids such a film may decompose into lime passing into solution and an insoluble silica gel tending to increase in volume.

* Related fundamental considerations affecting the production and behaviour of cement appeared in THE CHEMICAL AGE this year on March 27, page 428, May 1, page 611 ; and July 10, page 52.

Overseas News Items

Uranium in Australia.—A "promising" discovery of uranium in the Peake and Denison ranges of Central Australia, south of the township of Oodnadatta is reported by the Australian Department of Mines. An area of 2600 sq. miles round the find has been reserved for Government prospectors only.

Sunflower Scheme in Tanganyika.—55 per cent of the acreage at Kongwa is to be devoted to sunflowers and the remainder to groundnuts, it has been stated by General Harrison, resident member of the Oversea Food Corporation in East Africa. This is due to the fact that sunflowers are a good rotation crop, and will grow well on land not completely cleared of roots.

Full Production of U.S. Steel.—Operating at 99.9 per cent of theoretical capacity—the highest monthly rate since October, 1943—steel mills in the United States in October, 1948, turned out 7,973,416 net tons of ingots and steel for castings. That output exceeded the peak of March, 1944, by more than 147,000 net tons, according to the American Iron and Steel Institute.

Industrial Troubles in Italy.—Growing unemployment in Italy is reported to be having a serious effect on industry and falls in output have been seen in several sections of the chemical industry. The Government has had to grant a 600 million lira subsidy to the Societa Carbonifera Sarda to keep the mine going. There has been some doubt whether extraction can be economically continued.

Plastic Piping.—An extruded plastic pipe which can be bent and threaded has been placed on the market by the United States Rubber Co. Known as Kralite, the plastic pipe is said to be suitable for handling alkalis, non-oxidising acids, and aliphatic hydrocarbons, but not ketones, esters or aromatic hydrocarbons. Sizes range from ¼ in. to 2 in. outside diameter, and can withstand pressure up to 125 p.s.i.

Canada's Petroleum for U.S.A.?—The new oilfield at Redwater, Alberta, may confer on Canada's Prairie Provinces self-sufficiency in petroleum by 1950. In August, 1948, production in the Leduc, Lloydminster and Turner Valley fields was running at approximately 35,000 barrels per day, twice the August, 1947, figure. It is anticipated that, by the end of this year, production in these three fields will have increased to 45,000 barrels. It is possible that oil may ultimately be exported to the northern parts of the U.S.A.

Phosphate Development Project.—The development of the phosphate deposits at Dorowa, in the eastern district of Southern Rhodesia, by means of a pilot plant, is under consideration. An annual output of 20,000 tons by 1950 is anticipated, but it has not been determined yet whether the proposition would be a commercial success.

Nitrogen Fertiliser for Germany.—The Linz Nitrogen Works has expanded its loading equipment for chemical fertiliser, partly to facilitate shipments to Western Germany. Shipments, which began in November, aggregate 600 to 700 tons per day. The Linz works hopes to ship some 25,000 tons of nitrogen fertiliser to Germany in the remaining weeks of this year.

U.S.A. Needs 500 m. lb. More Aluminium.—Demand for aluminium in the U.S.A. is estimated to exceed 1948 production by 500 million lb., although present output is more than four times pre-war levels. The Aluminium Association, a private organisation, reports that nearly 1000 million lb. of primary aluminium were produced in the U.S.A. in the first nine months of 1948.

Resistance to Demolitions at Krupps.—In an attempt to save the 73 buildings scheduled for demolition in the Krupps undertaking at Essen, the local town council has appealed to the British Military Government to reconsider the whole demolition programme. This proposed to demolish 22 additional buildings, unless the Germans could redesign them for peaceful purposes, and to preserve 127 for light industries.

Hardwood for Rayons and Plastics.—Research by the International Paper Company of America is stated to have yielded a new process which enables hardwood trees to be utilised for the production of pulp to manufacture rayon, cellophane, plastics and other synthetic products. Mr. John H. Hinman, president of the company, claims that the hardwoods not only yield products of superior strength, but can also be processed more rapidly.

Scrap Aluminium Allegations.—A very marked rise in United Kingdom exports of scrap aluminium to the U.S.A. in the first 10 months of this year—to 111.3 million lb. compared with 3.49 million lb. in the whole of 1947—was reported by the Department of Commerce in Washington last week. The figures were produced in support of recent criticisms in the U.S.A. that British trading policy in respect of aluminium was being operated to the detriment of American interests and of Marshall Aid.

PAKISTAN'S CHEMICAL PROJECTS

Many New Industries Proposed or Started

By G. A. BROWNE*

PAKISTAN, mainly an agricultural country, has nevertheless a wealth of minerals, petroleum and water power awaiting development. Machinery, technical knowledge and some raw materials are required to establish new industries and develop others, and the Minister of Finance has invited foreign capital to participate in fulfilling this aim.

Interest has been shown locally in the establishment and development of the pharmaceutical industry. While some parties purpose beginning in a modest way with the packaging of drugs imported in bulk, others purpose making use of the local raw material available in the preparation of pharmaceuticals and drugs.

The Government is considering whether it should not acquire, by direct participation in the financial structure of the industry, some control through its representatives on the boards of directors over the quality and price of the products.

The highest importance is attached to the establishment of an up-to-date paper factory in Pakistan, preferably in East Bengal. The main raw materials required for making paper are available in abundance in that province.

Sugar

The development of sugar and other industries has also received attention. A 50,000-ton sugar factory is now being erected at Mardan, in the N.W.F.P., and is expected to be in production next year. The question of using molasses from the sugar industry is receiving attention, and a proposal to erect a power alcohol plant, with a capacity of 3000 gallons per day, is now under active consideration. It is expected that orders for such a plant will be placed at an early date.

Licences have been issued to three parties for the establishment of sulphuric acid plants in Pakistan. Orders have already been placed for two 10-ton contact plants, one in the United Kingdom and the other in the United States. Both plants will be in production next year, one at Karachi and the other at Rawalpindi. Two other private firms are interested in establishing similar plants in Western Pakistan.

A 10-ton plant for the production of caustic soda by electrolysis is to be established in the next twelve months in Western Pakistan. This plant will also produce 8.8 tons of chlorine per day, which is sufficient to meet Pakistan's requirements for water chlorination, manufacturing bleaching powder and other products based on chlorine as the starting material.

Chlorine

As an additional safeguard to ensure regular supplies of chlorine for Karachi, the government has agreed to the establishment of a four-mercury-cell plant, capable of producing approximately five tons of chlorine per month. This plant, which will meet the full requirements of the capital, is expected to be in production within six months.

There is a soda ash plant at Khewra, which has a relatively small capacity.

Apart from coal, the government is anxious to make full use of minerals to be found in Pakistan, and has recently appointed a Director of the Geological Survey of Pakistan, with headquarters at Quetta. The minerals requiring special attention, apart from petroleum and coal, are: asbestos, antimony, chromite, copper, glass sands, gypsum, lead, limestone, nitrates, potash and other salts, sulphur and strontium ore.

There is much to be done in exploration and production methods, most of the practical mining done in Pakistan being rather primitive.

†ESTIMATED MINERAL PRODUCTION IN PAKISTAN

		Tons
Limestone	West Punjab	440,000
	Sind	365,000
Chromite	Baluchistan (Zhob)	25,000
Coal (lignite)	Sind (Kohistan)	10,000
	Punjab (Salt Range)... ...	175,000
	Baluchistan (Ehost)	85,000
Fuller's earth	Sind (Sukkur)	5,000
	Sind (Hyderabad)	550
	Khairput State	3,000
Gypsum	Sind (Karachi)	2,000
	Punjab (Jhelum)	17,500
	Baluchistan (Sibi)	6,000
Iron ore	W. Punjab (Kconthal State)	600
Petroleum	W. Punjab (Attock) ...	75,000,000
Salt	Sind (desert deposits) ...	90,000
	Punjab (Salt Range)... ...	700,000
	Baluchistan	1,500
Steatite (soapstone)	N.W.F.P.	700
Antimony (stibnite)	... ...	200

† Latest available figures, 1944.

* Acting Canadian Government Trade Commissioner, in *Foreign Trade*, November 27, 1948, Vol. IV, No. 100, Ottawa.

Home News Items

Fruit Juice Imports.—Arrangements have been made by the Ministry of Food in agreement with the Board of Trade for the bulk importation under specific licence during 1949 of soft fruit juices from Australia and of citrus fruit juices from Australia and Sicily.

First Scottish Aluminium Bridge.—An aluminium footbridge, stated to be the first of its kind in Scotland, has been ordered by the North of Scotland Hydro-Electric Board for erection at Pitlochry to span the Tummel. The job is to be carried out in the Clutha Works, Glasgow, of P. & W. MacLellan, Ltd. The bridge will be made of special light-weight alloy, designed and rolled for structural purposes.

Demand for Chemical Plant.—Inquiries passing through the Engineering Centre, Ltd., last month showed a continued demand for chemical plant. Orders included: plant for atomic research from New Zealand, machinery for impregnation of tyre cord, rectifying stills, power cartridges, and many types of tools and instruments. From Spain came an inquiry for a complete chemical processing plant to produce cyanamide for fertilising product purposes. Keener competition from the continent is evidenced by offers from engineering concerns to undertake work for British firms.

Films for Industry.—Increasing use is being made by Imperial Chemical Industries, Ltd., of films including those made by the company's own film unit. The films are used to keep factory workers in touch with the wider aspects of their employment and the part which they played in chemical industry as a whole. The company last week showed a range of such films in their Ardeer chemical plant recreation club, including "Nobel Began It," which tells the story of Ardeer in documentary fashion, and "Rock of Industry," outlining the work of the I.C.I. lime division.

Scientific Food Production. — Chemical spraying as a method of disease control, correction of soil deficiencies, treatment of seed and destruction of pests from abroad were among the "Modern Methods in the Control of Plant Diseases," advocated by C. E. Foister, plant pathologist, Department of Agriculture for Scotland, speaking in Glasgow last week. Adoption of these and associated safeguards, such as certification schemes for growing crops, breeding for resistance, and controlled entry from abroad, could, he claimed, increase the value of 16 selected crops in Scotland from the present £56 million to £65 million.

Dunlop Benevolence.—The Dunlop Rubber Company has sent a donation of £500 to the YMCA War and National Service Fund; £200 to Toc H; 50 guineas to the British Sailors' Society, and £50 to the Soldiers', Sailors' and Airmen's Help Society.

I.C.I.'s New Copper Plant.—Key workers at Imperial Chemical Industries' 80 years old copper works on the River Irwell at Broughton, Lancashire, are expected shortly to move to the new model plant, the largest of its kind in Europe, now being built on a 50-acre site at Kirkby, Liverpool. The factory will eventually employ 3000.

Zinc Prices.—In a written reply to Mr. F. Jerroll, who asked in the House of Commons why it has been found necessary to increase the maximum prices of zinc and zinc products as outlined in S.I., 1948, No. 2592. Mr. J. Freeman said the maximum selling prices of zinc and zinc products have been increased because world prices had been increased.

Metal Powders Ignited.—Ignition of magnesium and aluminium powders above the works furnaces resulted in a fire difficult to subdue, except with large quantities of sand, at the works of the British Aluminium Co., Ltd., Latchford, on December 11. The bricks were red hot and had to be covered so that the powders could be removed. After two hours, during which workmen carried buckets of sand to the firemen, danger to a nearby oil feed line was averted.

Lead Mines Need Labour.—The annual report of the Weardale Lead Co., Ltd., Newcastle-on-Tyne, records that the labour supply has improved since the beginning of 1948, but that a further increase is essential to meet the company's plans and the increasing demand for fluorspar and lead ore. Production of fluorspar from the company's mines amounted to 7269 tons, and that of lead concentrates 268 tons, compared with 4548 tons and 178 tons respectively in the previous year.

Explosive Scrap.—An aircraft rocket 5 ft. long and weighing about 2 cwt., which was accidentally set off in the Clydebridge Steelworks, Glasgow, when being cut up for scrap, soared out of the yard, ricochetted off the main road, and landed in a field 1000 yards away, without causing any serious injury or damage. Several workmen were thrown to the ground by the blast, and as the missile skimmed across the yard it passed so close to another man that his hair and eyebrows were singed by flame from the tail.

Technical News and Services

A NEW heat-resistant "paint" which will withstand temperatures of more than 1000°F., has been developed by the Australian Council for Scientific and Industrial Research. The paint, according to the Australian Government Trade and Information Bureau, New York City, also gives greater protection against salt water corrosion, and it is claimed that ships painted with it will require far less repainting than formerly.

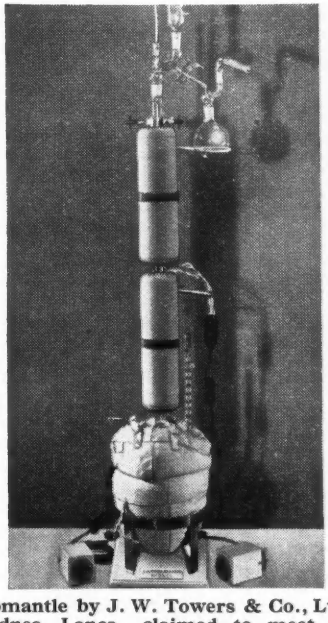
The non-inflammable basis of the new product is butyl titanate, produced from rutile and ilmenite, which are major components of beach sand deposits of New South Wales and Southern Queensland.

* * *

Many cleaning and sterilisation problems associated with dairy and similar plant have been eased in recent years by the introduction of stainless steel, monel metal, etc. Nevertheless, the dairy industry must regard the u. of detergents as a vitally important and special branch of cleaning. In an attractively produced booklet *The Cleansing of Modern Dairy Plant*, Joseph Crosfield & Sons, Ltd., deals at length with various cleaning problems, the manner in which the technical service and advantages of the company's laboratories and research departments are available to their customers and lists six detergents specially formulated in the Crosfield chemical department at Warrington, Lancashire.

* * *

The latest issue of "Philips Technical Review," Volume 10, No. 1, recently available, contains much of interest to those concerned with lighting, electronics, X-ray and other technical subjects. The main article is entitled "X-ray Spectrometer with Geiger Counter for Measuring Powder Diffraction Patterns" by J. Bleeksma, G. Klovs and H. J. Di Giovanni. With the spectrometer described, X-ray diffraction patterns are traversed by a Geiger counter tube detector instead of being recorded in the conventional fashion on a photographic film; the paper is well illustrated with diagrams and photographs. The action of oxygen and nitrogen on iron and steel is dealt with by J. D. Fast under the heading "The Part Played by Oxygen and Nitrogen in Arc-Welding." This it is announced is an introduction to a future article in which the function of the coating of welding electrodes will be analysed.



Isomantle by J. W. Towers & Co., Ltd., Widnes, Lancs., claimed to meet the need for a safe flask heater for inflammable liquids which can be accurately controlled.

The Diamond Research Laboratory, Johannesburg, South Africa, sponsored by Industrial Distributors (1946), Ltd., is said to be the only laboratory in the world devoted exclusively to investigations on all phases of the diamond. In an admirably illustrated booklet arranged by F. L. Jonsson & Company (Pty.), Ltd., of Johannesburg, the scope of research, problems for investigation and laboratory facilities are described.

* * *

A new 12-pp. booklet describing the heat, chemical and weather resistant qualities of Plexene M, a modified polystyrene powder for injection moulding, has just been published by the plastics department of the Rohm and Haas Company, Philadelphia, Pa. Complete technical data on physical and mechanical properties, including its resistance to chemical solvents and reagents, are listed.

(*Continued overleaf*)

A list of periodicals which have resumed publication in Germany has been published by the Foreign Office (German Section), S.W.1, where it can be seen in the German General Economic Department. The list contains the surprisingly large number of more than 300 periodicals, divided in the following groups: Agriculture and Forestry (52); mathematics, physics, chemistry (46); medicine (84); natural science (46); technology and industry (84); details are given concerning editors, publishers, prices of subscription, etc. A list of the periodicals which are now being published in Austria is in preparation.

* * *

Further evidence of the expanding use of polyvinyl chloride in widely differing industries is contained in a statement issued by James North & Sons, Ltd., of Hyde, Cheshire, announcing the successful application of PVC to the manufacture of specially resistant gloves, well adapted to use in some chemical processes. The continuing acute natural rubber supply position after the war fostered and accelerated the research work in connection with and the development of polyvinyl chloride, which was found to be the most effective substitute for the natural latex formerly used, for example, in cable covering.

When the process of manufacturing PVC had been perfected, the cable covering industry had first priority on all available supplies, and it was not until production had increased beyond the demand from this particular trade that supplies of PVC solution became available for other uses. Continued research evolved PVC paste, which James North & Sons, Ltd., adopted as a more satisfactory medium and installed a plant for the dipping and curing of PVC gloves. After many trials, the most suitable fabric base for this job was decided upon, and bulk quantities of PVC gloves based on this method of production became available early in 1947.

Since that date, the increasing demand for this type of glove from widely divergent trades has produced evidence of its standing up to abrasion, sharp materials, and an extensive range of chemicals, both acid and alkali, including anhydrous hydrofluoric acid. A patent has been applied for covering the whole manufacturing process.

Widening Production of Nylon and Rayon

THE spinning of nylon, an intricate process involving many interesting stages and the employment of skilled labour, is being carried out by the new Pontypool factory of British Nylon Spinners. The factory contains the biggest nylon-spinning plant in one building in Europe and is a very fine example of modern industrial architecture. Planning for the job has been the all-important consideration in the construction of the Pontypool factory, with the result that the flow of production is geared for ease and economy.

From 1941, when nylon was first spun in Britain, to the end of the war, all the yarn produced was used for parachutes and glider tow-ropes. Post-war development has already found a use for nylon in more than 100 different textile products. In fifteen months' time the Pontypool factory will be working at full capacity, and production of nylon yarn as continuous filament will then be 10,000,000 lb. per annum. There is also a good prospect of producing nylon staple in three to five years' time.

More Rayon Supplies

A new rayon factory, branch of British Celanese, Ltd., Derby, is to be opened shortly at Goose Green, Wigan, to supply manufacturers of rayon textiles in the area. The factory comprises one main single-span production shed, and is expected to employ about 700 when it comes into full production on a two-shift system.

Genesis of an Industry

The genesis of the synthetic fibre industry was recalled in a talk given recently in Macclesfield, by Mr. N. Ward, chemist of British Erika, Ltd., Liverpool, to the local section of the Textile Institute. Only in the last 60 years, he observed, had man been able to make the fibres he needs.

The Comte de Chardonnet in France in 1884 had perfected a process in which a solution of nitrocellulose in ether had been pumped through a fine jet into a water bath. Coagulating, it formed a continuous fine filament which closely resembled silk. This discovery, which aroused great comment, was quickly followed by others, and between 1900 and the Great War, factories sprang up all over Europe to exploit the possibilities of man-made yarns.

The early rayon yarns had all been lustrous and had had continuous filaments. Later, dull and matt yarns varied the filaments' appearance. Other types of yarns were invented, including fibres made of protein material from milk, peanuts or soya beans, and alginate yarn from seaweed. Today total production of synthetic fibres equalled the world use of wool.

American Chemical Notebook

From Our New York Correspondent

INSTALLATION of new plant by the B. F. Goodrich Chemical Company at its works in Port Neches, Texas, operated for the U.S. Government, will increase production of "cold rubber" to 30,000 tons annually. William S. Richardson, president of the company, stated that the increased capacity had been authorised by the U.S. Government agency, the Reconstruction Finance Corporation, which controls plants manufacturing American rubbers. It is expected that the new plant, which requires additional refrigeration, will be ready next year. The bulk of the production will go into tyre treads, but other uses are for conveyor belting and heavy duty hose.

* * *

The Reconstruction Finance Corporation announced recently that the former Government-owned neoprene synthetic rubber plant at Louisville, Kentucky, has been sold to E. I. Du Pont de Nemours and Company, Inc., for $13.2 million. Under the agreement the company must maintain for national security purposes, a productive capacity in the plant of not less than 45,000 long tons of neoprene for at least five years.

* * *

A new system for eliminating radio interference caused by Inert-Arc welding, the result of five years' research, has been developed by the General Electric Company in America. The balanced wave welder dispenses with the continuous use of high frequency voltages by balancing the current with a bank of series capacitors, so that pure a.c. flows between the electrode and the work and cuts out the high frequency radio noise. The new method is stated to give a cleaner and more controlled weld, and result in a saving of argon gas used in the process.

* * *

A forceful plea for the continued U.S. support for the tartaric acid industry was recently made in Washington. P. W. Anderson, representing the industry, told the United States Tariff Commission and the Committee for Reciprocity Information that a reduction in the duty on this and allied products, would seriously embarrass the industry.

* * *

The steel capacity of the United States has increased 17.5 per cent, or more than 14 million tons, in the ten years since 1938, according to the new *Directory of Iron and Steel Works of the United States and Canada*, just issued by the American Iron and Steel Institute. There has also been an increase of about 19 per cent in blast furnace capacity. Expansion and development programmes for the industry totalling $1.7 million since the end of the war, are expected to increase production still further.

* * *

Production of inorganic chemicals in the United States for September, 1948, showed an increase over the same month of the previous year in 21 out of the 35 chemicals listed by the Bureau of the Census, U.S. Department of Commerce. Small gains in output were reported in synthetic anhydrous ammonia, ammonium nitrate, and hydrochloric, nitric, and phosphoric acids, but declines occurred in the production of calcium carbide, carbon dioxide, soda ash, caustic soda, and sulphuric acid.

* * *

The first plant to make sulphur from natural gas, the joint project of several oil companies, is expected to be completed and in operation in the Elk Basin oil fields of Wyoming next year. The plant, a conventional natural gasoline plant, will take natural gas from the field and extract its gasoline content. Gas from the Elk Basin field, however, contains almost 20 per cent hydrogen sulphide, which will also be produced. Upon completion, it is anticipated the plant will handle 12 million cu. ft. of natural gas daily, from which about 17,000 gallons of gasoline, 39,000 gallons of propane and butane and more than 70 long tons of sulphur will be obtained daily.

* * *

Marking its entry into the field of organosilicon chemicals, the Linde Air Products Co., a unit of the Union Carbide and Carbon Chemicals Corporation, is offering four compounds of the alkyltrichlorosilane and the alkyltriethoxysilane type in pilot plant quantities. As production facilities are expanded, officials said, additional organosilicons will be made available. Ethyl- and amyl-trichlorosilane, and ethyl- and amyl-triethoxysilane have currently been made available in quantities suitable for investigational and process-testing studies in the organosilicon field. It is believed that these materials will find many uses both in direct application and as "building blocks" in the production of intermediates, polymers and copolymers. Colourless liquids, with molecular weights ranging from 163 to 234, and soluble chemicals, these four silanes are expected to stimulate research in numerous fields.

Australian Distinction

Chemical Institute's Choice

SIR DAVID RIVETT, K.C.M.G., F.R.S., who, as announced in THE CHEMICAL AGE of July 24, accepted the presidency of the Society of Chemical Industry for 1948-49, has just been appointed president of the

Sir David Rivett

Australian Chemical Institute. He is chairman of the Commonwealth Council for Scientific and Industrial Research and a director of Imperial Chemical Industries of Australia and New Zealand. The works manager of I.C.I. Alkali (Australia) Pty., Ltd., of Osborne, DR. R. R. GARRAN, has been elected to the Commonwealth CSIR.

JAPANESE IMPORTS CUT

STATISTICS released last week by the U.S. Department of Commerce indicate an upward trend in Japanese chemical production and marked reductions in Japanese imports of some chemical products. Production of ammonium sulphate in Japan during the first six months of 1948 totalled 451,637 metric tons and the monthly average was 75,272 tons, against 60,082 tons in 1947. Output of calcium cyanamide in the same half year was 90,769 tons and of superphosphate to 450,458 tons, a monthly average of 75,076 tons as compared with a monthly average of 59,078 tons the year before. Imports of phosphate rock, 296,945 tons compare with an average of 90,648 tons monthly in 1947.

Coconut Products

Heightened Activity in Ceylon

THE completion of an agreement for the shipment of copra and coconut oil between India and Ceylon, similar to the Ceylon-United Kingdom agreement has lately been sought by Mr. Dharma Vira, secretary to the Indian Cabinet, who has arrived in Ceylon. India needs about 44,000 tons of copra and oil annually. There is a shortage of coconut oil in India because the production of other oils has been stepped up. India still receives copra from the Philippines and Malaya, but the proposal now is to have a separate agreement with Ceylon.

Licences covering 11,850 tons of desiccated coconut for export out of a possible 13,600 tons have now been issued to exporters. Under the prevailing system the manufacture and export of desiccated coconut is subject to licence. Pre-war, the exports in the free market amounted to nearly 30,000 tons.

Changing Export Policy

That Ceylon should export as much as possible of her copra in the form of oil, so as to provide work for the oil mills in the Island as well as to promote local animal husbandry was urged by a deputation which met the Minister of Trade and Commerce, Mr. C. Suntherlingam. The Island's annual requirements of coconut poonac amount to nearly 40,000 tons, equivalent to 80,000 tons of oil. Under the copra agreement, Ceylon supplies to the United Kingdom 40,000 tons of coconut oil. If Pakistan cannot take delivery of her 8000 tons of oil, it will be sold on the basis of copra. This leaves a further 32,000 tons in terms of oil to be exported in the free market.

Ceylon fresh coconuts are at present fetching as much as Rs. 250 per 1000 nuts in the open market. The demand from the Middle East countries and India is so great that the record price level of Rs. 275 per 1000 which was touched in March-April this year, is expected to be equalled if not surpassed. Up to the end of August this year 5 million coconuts, valued at more than Rs. 1 million, have been sent out of the Island.

Japanese Physical and Chemical Research.—Japan's Institute of Physical and Chemical Research has recently been dissolved and its work has been taken over by the Scientific Research Institute, Ltd., Komagome, Bunkyo-ku, Tokio. The organisation's two journals have been renamed as follows: the *Journal of the Scientific Research Institute* and the *Kagaku Kenkyujo Hokoku* (Reports of the Scientific Research Institute).

Personal

DR. ERNEST H. VOLWILER, executive vice-president of Abbott Laboratories, North Chicago, Illinois, and leader in the field of medicinal chemistry has been chosen president-elect of the American Chemical Society, for 1949. Next year's president is PROF. LINUS PAULING, chairman of the division of chemistry and chemical engineering in the California Institute of Technology. Dr. Volwiler, who is 54, was elected in a national ballot of the 59,000 members of the society. He is well-known for his practical research, and his interest in the relationship between the chemical structure of compounds and their physiological activity resulted in the introduction of such drugs as butyn sulphate, a local anæsthetic; butesin, an analgesic; and pentothal sodium, a barbiturate. In 1947 he received the Honour Scroll Award of the American Institute of Chemists.

MESSRS. G. J. COLE, W. A. FAURE, H. S. A. HARTOG, F. D. MORRELL and A. H. SMITH have been appointed members of the board of Lever Brothers & Unilever, Ltd. They will later be proposed as directors of Lever Brothers & Unilever N.V.

MAJOR-GENERAL J. A. M. BOND has been appointed a director of the Pearson and Knowles Coal and Iron Company.

MR. GEORGE ARCHER and MR. J. K. BRINDLEY have been appointed directors of the Mond Nickel Company.

MR. F. A. SZARVASY, a director of Dunlop Rubber Co., Ltd., colliery and other companies, left £71,490 gross, with net personalty £43,065.

MR. GEORGE BENTFIELD CLEMONS, of Leeds, chairman and joint managing director of the Yorkshire Dyeware and Chemical Company, Ltd., left £59,560.

MR. H. J. PENN, a director of Murex, Ltd., has been appointed general manager of the Murex group of companies.

Obituary

SIR WILLIAM EDGE, Bt., formerly Liberal M.P. for Bolton, and for the Bosworth division of Leicester from 1927 to 1945, whose death is announced, at his home at Lytham St. Annes, Lancs., at the age of 68, was associated most of his life with the family dye manufacturing business—of which he later became the head—of William Edge & Sons, Ltd., Dolly Blue Works, Bolton.

MR. ROBERT WILLIAM MARTIN, founder and governing director of Bob Martin, Ltd., manufacturers of veterinary preparations, Southport, has died at the age of 81.

The death occurred last month in Montreal of MR. JOSEPH W. HOLMES, aged 63, sales manager of the explosives division of Canadian Industries, Ltd.

President-elect, American Chemical Society, and a leader in medicinal chemistry, Dr. E. H. Volwiler

Dr. Marjory Stephenson, pioneer in chemical micro-biology, whose death was announced in our last issue

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsibe for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

JOHN BROWN & CO., LTD., Sheffield. (M., 25/12/48.) November 2, sub-mortgage supplemented to Trust Deed registered October 24, 1944; charged on properties comprised in a mortgage dated November 1, 1948,. situate at Scunthorpe. *£476,168. July 12, 1948.

WELDING TOOL DEVELOPMENTS, LTD., Birmingham. (M., 25/12/48.) November 10, £3000 debenture to J. P. Hodgson, Liverpool, and another; general charge. *Nil. August 19, 1948.

Satisfactions

COPPERAD, LTD. (formerly BRITISH UNIT HEATER CO., LTD., TERRELL'S IRON STEEL & COAL CO., LTD., and TERRELL'S IRON & STEEL CO., LTD.), London, E.C. (M.S., 25/12/48.) Satisfaction November 15, of debenture registered May 27, 1947.

PEARSON & KNOWLES COAL & IRON CO., LTD., London, E.C. (M.S., 25/12/48.) Satisfaction November 15, of debenture stock registered February 10, 1922, March 25, 1927, and December 30, 1930, to the extent of £836,039.

PENDER PLATING, LTD., Poole. (M.S., 25/12/48.) Satisfaction November 11, of mortgage and charge registered August 14, 1947.

RENISHAW IRON CO., LTD. (M.S., 25/12/48.) Satisfaction November 17, of charge registered December 1, 1942.

Company News

At the 14th annual general meeting of **Glaxo Laboratories, Ltd.**, Sir Harry Jephcott (chairman and managing director), announced that the value of the company's export and overseas sales for the nine months ending June 1948 was twice that of the total sales—home and abroad—for 1938/9.

Powell Duffryn, Ltd. announces the following dividends (less tax): For the year ending March 31, 1949: ordinary stock 3 per cent on the £9,660,471 stock, payable on February 23; for the half year to December 31: 4¾ per cent cumulative preference stock, 2⅜ per cent on the £3,600,000 stock, payable January 22.

New Companies Registered

Dexters Paints (Manufacturing), Ltd. (461,959).—Private company. Capital £1000. Directors: C. Eatough, J. C. Eatough, H. C. Eatough. Reg. office: Albert Works, Trafalgar Street, Burnley.

L. B. Holliday (Holdings), Ltd. (461,572). Private company. Capital £100. To acquire the issued share capital of L. B. Holliday & Co., Ltd., and to carry on the business of dye and chemical manufacturers, manufacturing chemists, etc. Reg. office: Leeds Road, Deighton, Huddersfield.

Industrial and Marine Protective Appliances, Ltd. (461,435). Private company. Capital £1000. Suppliers of materials for the protection of metal, concrete, and wood against corrosion and chemical action. Directors: P. A. Chennell, G. T. Gitsham, G. R. Baker and P. E. Baker. Reg. office: 55 Bradley Lane, Bradley Fold, nr. Bolton.

Moldex (London), Ltd. (461,873). Private company. Capital £1000. Manufacturers of materials and articles composed of latex, synthetic and/or natural rubber, etc. Directors: P. P. Forbes and F. E. Daniels. Reg. office: 156 Ballards Lane, Finchley, N.3.

Rea Manufacturing Co. (Birmingham), Ltd. (461,518). Private company. Capital £1000. Manufacturers of chemicals, etc. Directors: H. K. Priestley and W. E. Stokes. Reg. office: Rea Works, 62 and 63 Bissell Street, Birmingham, 15.

Roli Manufacturing Co., Ltd. (461,404).—Private company. Capital £100. Manufacturers of fine chemicals, etc Director: T. H. S. Ross. Reg. office: 112-114 Cannon Street, E.C.4.

Silicoils, Ltd. (461,455). Private company. Capital £100. Technical and scientific research relating to media oils, greases, etc., in combination with organo silicates, silicones, etc. Directors: J. F. O'Brien, New Jersey; E. S. W. Biddlecombe. Reg. office: 85 Gracechurch Street, E.C.3.

Wallerstein & Co., Ltd. (461,365).—Private company. Capital £5000. Manufacturers of chemical preparations, etc. Directors: L. Wallerstein, J. Wallerstein, W. Graf and B. Stoller, all of 180 Madison Avenue, New York City; and A. T. Wheeler, 3 Torrington Court, S.E.26. Reg. office: Rex House, 38 King William Street, E.C.4.

Chemical and Allied Stocks and Shares

ALTHOUGH holiday influences are continuing to restrict Stock Exchange business, a firm undertone has been maintained and British Funds have again been higher on balance, although at the time of writing, best levels have not been held. Industrial shares have been attracting rather more attention because the small yields on gilt-edged stocks are tending to switch investment demand in other directions.

Financial results coming to hand continue to emphasise that companies prominent in both home and export markets are still doing well; but on the other hand, caution is the keynote and a large proportion of profits is being placed to reserves for specific purposes, notably to guard against any heavy fall in commodity prices or a reaction in the cost of materials. In many cases leading industrial companies are now carrying record stocks of materials; consequently any sharp fall in prices next year might mean big losses.

Turner & Newall is able to report bumper profits for the past financial year, and apart from £1 million placed to general reserve, another £1 million of the past year's profits goes to a special reserve against investments in overseas subsidiaries. Annual meeting of Tube Investments revealed that the group has cut prices of its products on a scale of £1 million annually in the national interest. This has stimulated demand and the company has benefited; but there is now another side to the picture, namely, the high cost of materials it now has to face and mounting expenses resulting from the cost of the National Health scheme, which are estimated to call for an additional £900,000 from the group this year.

Chemical and kindred shares have been unaffected by the President of the Board of Trade's decision to institute a survey into the industry's position and outlook. This was not unexpected, although it has been suggested in the City that the survey might form a basis for nationalisation if after the next General Election another Labour Government were returned.

Imperial Chemical at 48s. 9d have been in better demand, it being pointed out that the directors have expressed the view that there are reasonable prospects of the 10 per cent dividend being maintained on the larger capital in future. On this basis there is a not unattractive yield at the current price.

Turner & Newall at 80s. 4½d. have responded moderately to the record financial results for the past year. This is a case where there would probably have been an increase in the dividend had it not been for the Government's dividend limitation request. Shareholders are again limited to 15 per cent, although actual earnings on the shares are very substantially above this rate.

Monsanto Chemical shares have remained firm at 62s. 6d., Albright & Wilson at 31s., and Amber Chemical 2s. shares at 9s. 3d., while Fisons were again 59s., and Laporte 4s. units at 21s. 6d. Dunlop Rubber after touching 76s. at the end of last week turned easier with the general trend of markets. A feature has been further demand for Glaxo Laboratories' 10s. shares, which at £21½ have risen by over £2. Demand is based on the view that this is a case where there is scope for a good dividend increase when Sir Stafford Cripps lifts his dividend limitation request.

Oil shares became more prominent, V.O.C. being raised sharply to nearly £7½ following the Shell offer to issue two Shell shares for every V.O.C. share. The Shell group already has a majority holding in V.O.C. Burmah Oil and Anglo-Iranian also moved in favour of holders, but oils generally failed to hold all earlier gains.

Aluminium Alloy Castings

In order to improve contacts with the industry, both in connection with sales and technical problems concerning aluminium alloy castings, Renfrew Foundries, Ltd., Glasgow, announces that, as from the beginning of next year, fully qualified sales engineers have been appointed as follows, to cover five areas in England, Scotland and Wales. Scotland: R. MCGLASHAN, Hillingdon, Glasgow, S.W.2; Northern England: A. J. HEBDEN, Shipley, Yorkshire; Midlands and Wales: J. A. K. FERGIE, Adderbury, Banbury, Oxfordshire; North London and Eastern Counties: E. P. MENDOZA, Edgware, Middlesex; South London and Southern England: J. S. THOMPSON, Uxbridge, Middlesex.

New Austrian Chemical Company.—A new chemical company, the Steirische Chemie Aktiengesellschaft, Kapfenberg, has recently been registered in Leoben, Styria, Austria. A substantial part of the initial capital of six million schillings is controlled by the Austrian Credit Institute. The company is to produce hardening powders for the metallurgical industry as well as carbon sulphide to be supplied to the Lenzing staple fibre plant, the St. Pölten rayon works, and to agricultural co-operatives. It is proposed to cover Austria's whole carbon sulphide requirements, thus dispensing with imports from Switzerland and Czechoslovakia.

Prices of British Chemical Products

THERE have been no outstanding features in the various sections of the industrial chemicals market nor have there been price changes of any importance. Most reports indicate active conditions, with the leading home consuming industries again calling for deliveries up to the full extent of contract commitments. Added to this, buying for shipment remains persistent and export figures are expected to show an increase despite competition in overseas markets. The coal tar products market is steady with an average business being put through. Supplies in this section are easier with quotations unchanged.

MANCHESTER.—Deliveries of the alkali products and other heavy chemicals to domestic users in Lancashire and the West Riding of Yorkshire, especially to the textile and allied industries, have continued on a steady scale against existing contracts during the past week, although so far as volume of inquiry and actual new business is concerned there have been indications of the usual seasonal falling off. This may be expected to continue until after the turn of the year. The outlook for 1949, however, is regarded as promising both for home and export business and a return of buying interest to its recent level is anticipated. The market as a whole continues on a firm basis and future price changes seem more likely to be up than down.

GLASGOW.—There has been no change of note in conditions prevailing in the Scottish chemical market during the past week. Prices for prompt delivery have remained constant, although some price alterations in deliveries in the New Year have been advised. So far, no general increase in prices has been made known and in some cases small decreases are expected to occur. The supply position has remained unchanged and turnover has in general been on a slightly reduced scale, as expected.

Price Changes

Rises: Cobalt oxide, litharge, zinc oxide, naphtha.

Reductions: Lactic acid, sodium metaphosphate.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton, £64; 80% pure, 1 ton, £66; commercial glacial 1 ton £79; delivered buyers' premises in returnable barrels: £4 10s. per ton extra if packed and delivered in glass.

Acetic Anhydride.—Ton lots, d/d, 11¾d. per lb.

Acetone.—Maximum prices per ton, 1/5 tons, £76 10s.; single drums, £77 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alcohol, Industrial Absolute.—50,000 gal. lots, d/d, 2s. 7⅞d. per proof gallon; 5000 gal. lots, d/d, 2s. 10⅝d. per proof gal.

Alum.—Loose lump, £17 per ton, f.o.r. MANCHESTER: £16 10s.

Aluminium Sulphate.—Ex works, £11 10s. per ton d/d. MANCHESTER: £11 10s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate. — MANCHESTER: £48 per ton d/d.

Ammonium Carbonate.—£48 per ton d/d in 5-cwt. casks. MANCHESTER: Powder, £50 d/d.

Ammonium Chloride. — Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £21 to £25 per ton. See also Salammoniac.

Ammonium Nitrate.—D/d, £18 to £20 per ton.

Ammonium Persulphate.—MANCHESTER: £5 per cwt. d/d.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £78 and £76 10s. per ton.

Antimony Oxide.—£162 10s. per ton.

Antimony Sulphide.—Golden, d/d, as to quantity, etc., 4s. to 5s. per lb.

Arsenic.—Per ton, £40 5s. to £41 5s., according to quality, ex store.

Barium Carbonate.—Precip., d/d; 2-ton lots, £25 15s. per ton, bag packing, ex works.

Barium Chloride.—Currently imported at fluctuating rates.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £26 10s. per ton d/d; 2-ton lots, £26 15s. per ton.

Bleaching Powder.—Spot, 35/37%, £11 10s. per ton in casks.

Borax.—Per ton for ton lots, in free 1-cwt. bags, carriage paid: Commercial, granulated, £30; crystals, £31; powdered, £31 10s.; extra fine powder, £32 10s. B.P., crystals, £39; powdered, £39 10s.; extra fine, £40 10s. Borax glass, per

ton in free 1-cwt. waterproof paper-lined bags, for home trade only, carriage paid: lump, £77; powdered, £78.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granulated, £52; crystals, £53; powdered, £54; extra fine powder, £56. B.P., crystals, £61; powder, £62; extra fine, £64.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £8 12s. 6d. per ton, in 4 ton lots.

Charcoal, Lump.—£25 per ton, ex wharf. Granulated, £30 per ton.

Chlorine, Liquid.—£29 per ton, d/d in 16/17-cwt. drums (3-drum lots).

Chrometan.—Crystals, 5⅝d. per lb.

Chromic Acid.—1s. 10d. to 1s. 11d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Cobalt Oxide.—Black, delivered, 7s. 7d. per lb.

Copper Carbonate.—MANCHESTER: 1s. 7½d. per lb.

Copper Chloride.—(53 per cent), d/d, 1s. 10½d. per lb.

Copper Oxide. — Black, powdered, about 1s. 4½d. per lb.

Copper Nitrate.—(53 per cent), d/d, 1s. 8½d. per lb.

Copper Sulphate.—£42 10s. per ton f.o.b., less 2%, in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., from 157s. per 1-2 cwt. lot, d/d.

Ethyl Acetate.—10 tons and upwards, d/d, £115 per ton.

Formaldehyde.—£31 per ton in casks, according to quantity, d/d. MANCHESTER: £32.

Formic Acid.—85%, £64 per ton for ton lots, carriage paid. 90%, £67 5s. per ton.

Glycerine.—Chemically pure, double distilled 1260 s.g., 123/1 per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d to 8s 9d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—1s. 0½d. per lb. d/d, carboys extra and returnable.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Iron Sulphate.—F.o.r. works, £3 15s. to £4 per ton.

Lactic Acid.—Pale, tech., £70 per ton; dark tech., £60 per ton ex works; barrels returnable.

Lead Acetate.—White, 125s. to 130s. per cwt., according to quantity.

Lead Carbonate.—British dry, ton lots, d/d, £116 10s. per ton.

Lead Nitrate.—About £125 per ton d/d in casks. MANCHESTER: £125.

Lead, Red.—Basic prices per ton: Genuine dry red lead, £127; orange lead, £131. Ground in oil: red, £149 10s., orange, £161 10s. Ready-mixed lead paint: red, £154; orange, £169 10s. (subject to increase of £1 10s. per ton).

Lead, White.—Dry English, in 8-cwt. casks, £136 per ton. Ground in oil, English, in 5-cwt. casks, £157 10s. per ton.

Lime Acetate.—Brown, ton lots, d/d, £18 to £20 per ton; grey, 80-82 per cent, ton lots, d/d, £22 to £25 per ton.

Litharge.—£124 10s. to £127 per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 5s.

Magnesium Carbonate.—Light, commercial, d/d, £70 per ton.

Magnesium Chloride.—Solid (ex wharf), £27 10s. per ton.

Magnesium Oxide.—Light, commercial, d/d. £160 per ton.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—Per lb., for 2-cwt. lots, 7s. 6d.; smaller quantities dearer.

Mercurous Chloride.—8s. to 9s. per lb., according to quantity.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methanol.—Pure synthetic, d/d, £28 to £38 per ton.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 4s. 10d. per gal.; pyridinised 64° O.P. 100 gal., 4s. 11d. per gal.

Nickel Sulphate.—F.o.r. works, 3s. 4d. per lb.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£128 to £133 per ton packed in free 5-cwt. casks.

Paraffin Wax.—Nominal.

Phosphoric Acid.—Technical (S.G. 1.500), ton lots, carriage paid, £61 per ton; B.P. (S.G.1.750), ton lots, carriage paid, 1s. 1d. per lb.

Phosphorus.—Red, 3s. per lb. d/d; yellow, 1s. 10d. per lb. d/d.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £76 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate. — Crystals and granular, 9½d. per lb.; ground, 10½d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £64 per ton for 1-ton lots, ex store; hydrated, £58 for 1-ton lots.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Chloride.—Industrial, 96 per cent, 6-ton lots, £16.10 per ton.

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 8½d. per lb. for 1-cwt. lots; for 3 cwt. and upwards, 1s. 8d. per lb.; technical, £7 14s. 3d. to £8 6s. 3d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £21 to £25 per ton, in casks, ex store.

Salicylic Acid.—MANCHESTER: 1s. 11d. to 3s. 1d. per lb. d/d.

Soda Ash.—58° ex depôt or d/d, London station, £7 12s. 6d. to £8 7s. 6d. per ton.

Soda, Caustic. — Solid 76/77%; spot, £18 4s. per ton d/d.

Sodium Acetate.—£60-£75 per ton.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 8d. per lb.; anhydrous, 7½d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite. — Powder, 60/62%, £28 7s. 6d. per ton d/d in 2 ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

Sodium Chlorate.—£45 to £47 per ton.

Sodium Cyanide.—100 per cent basis, 8d. to 9d. per lb.

Sodium Fluoride.—D/d, £4 10s. per cwt.

Sodium Hyposulphite.—Pea crystals 22s. 6d. per cwt. (2-ton lots); commercial, 1-ton lots, £16 per ton carriage paid. Packing free.

Sodium Iodide.—B.P., 10s. 2d. per lb. to 12s. 1d. according to quantity.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £103 ton.

Sodium Metasilicate.—£19 5s. per ton, d/d U.K. in ton lots.

Sodium Nitrate.—Chilean Industrial, 97-98 per cent, 6-ton lots, d/d station, £19 15s. per ton.

Sodium Nitrite.—£28-29 per ton.

Sodium Percarbonate.—12½% available oxygen, £7 per cwt. in 1-cwt. drums.

Sodium Phosphate.—Di-sodium, £32 10s. per ton d/d for ton lots. Tri-sodium, £62 per ton d/d for ton lots.

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Silicofluoride.—Ex store, nominal.

Sodium Sulphate (Glauber Salt).—£8 per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. £6 per ton d/d station in bulk. MANCHESTER: £6 5s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot. £23 per ton, d/d, in drums; broken, £23 15s. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £14 12s. 6d. to £16 17s. 6d., according to fineness.

Sulphuric Acid.—168° Tw., £6 to £7 per ton; 140° Tw., arsenic free £4 5s. to £5 5s. per ton; 140° Tw., arsenious, £4 15s. per ton. Quotations naked at sellers' works.

Tin Oxide.—1-cwt. lots d/d £25 10s.

Titanium Oxide.—Comm., ton lots, d/d, (56 lb. bags), £97 per ton.

Zinc Oxide.—Maximum prices per ton for 2-ton lots, d/d; white seal, £101 15s.; green seal, £100 15.; red seal, £99 5s.

Zinc Sulphate.—No quotation.

Rubber Chemicals

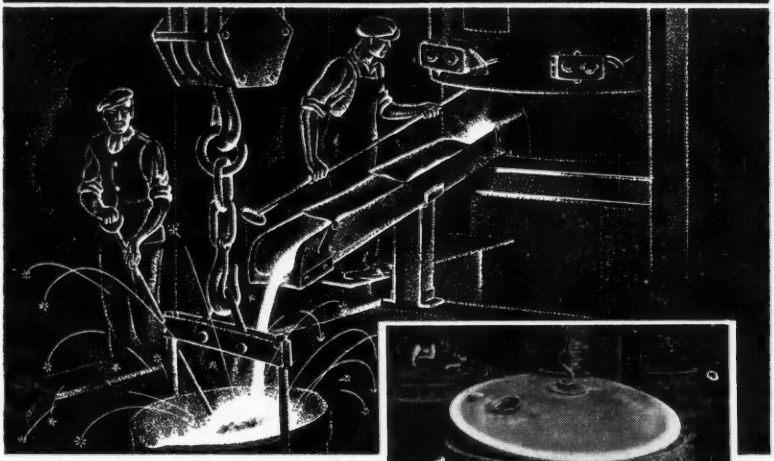
Antimony Sulphide.—Golden, 3s. to 4s. per lb. Crimson, 2s. 7½d. to 3s. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

FOR SPECIALISED CASTINGS



The photograph reproduced on the right shows a cast-iron caustic pot and cover for shipment to Sweden. Dimensions: Pot, 7 ft. 10¼ in. inside diameter by 9 ft. 1½ in. overall depth; weight, 9¾ tons; cover, 7 ft. 10¾ in. diameter, weight, 23 cwts.

High standards, backed up by close supervision over all materials and workmanship assure the unvarying good quality of Widnes castings. Widnes Foundry have the facilities, the men and the experience to produce the most intricate and accurate special-purpose castings and this combination is at **your** service from the moment you get in touch.

★ **WIDNES FOUNDRY are specialists**

in the production of cast and fabricated vessels and equipment in cast irons, mild and stainless steels for the **CHEMICAL, OIL, FOOD and ALLIED INDUSTRIES.**

WIDNES FOUNDRY & ENGINEERING CO. LTD

TELEPHONE WIDNES 2061 (6 LINES) TELEGRAMS 'FOUNDRY' WIDNES

LUGSDALE ROAD · WIDNES · LANCS

London Office: **BRETTENHAM HOUSE, LANCASTER PLACE, STRAND, W.C.2.**

Carbon Bisulphide.—£37 to £41 per ton, according to quality, in free returnable drums.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£56 to £59 per ton, according to quantity.

Chromium Oxide.—Green, 2s. per lb.

India-rubber Substitutes.—White, 10 5/16d. to 1s. 5¾d. per lb.; dark, 10½d. to 1s. per lb.

Lithopone.—30%, £33 12s. 6d. per ton.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermillion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Phosphate.—Not quoted—temporarily unobtainable.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, in January, £10 5s., rising by 1s. 6d. per ton per month to March, 1948.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers. — Per ton d/d farmer's nearest station, I.C.I. No. 1 grade, where available, £14 18s. 6d.

"Nitro-Chalk."—£10 4s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £17 5s. per ton; granulated, over 98%, £16 per ton.

Coal-Tar Products

Benzol.—Per gal. ex works: 90's, 2s. 6d.; pure, 2s. 8½d.; nitration grade, 2s. 10½d.

Carbolic Acid. — Crystals, 11½d per lb. Crude, 60's, 3s. 6d. to 4s. 3d. MANCHESTER: Crystals, 10¾d. to 1s. 0½d. per lb., d/d; crude, 4s. 3d., naked, at works.

Creosote.—Home trade, 6½d. to 9¾d. per gal., according to quality, f.o.r. maker's works. MANCHESTER: 6½d. to 9¾d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 4s. 4d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 11d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 4d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, ton lots, in sellers' bags, £8 1s. to £12 13s. per ton according to m.p.; hot-pressed, £14 15s. to £15 14s. per ton, in bulk ex works; purified crystals, £28 to £43 5s. per ton. Controlled prices.

Pitch.—Medium, soft, home trade, 100s. per ton f.o.r. suppliers' works; export trade, £8 5s. to £9 5s. per ton f.o.b. suppliers' port. MANCHESTER: 100s. f.o.r.

Pyridine.—90/140°, 18s. per gal.; 90/160°, 14s. MANCHESTER: 17s. 6d. to 21s. per gal.

Toluol.—Pure, 3s. 2½d. per gal.; 90's, 2s. 4d. per gal. MANCHESTER: Pure, 3s. 2½d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 3½d. to 3s. 6d. per gal., according to grade, d/d.

Wood Distillation Products

Calcium Acetate.—Brown, £15 per ton; grey, £22.

Methyl Acetone.—40/50%, £56 to £60 per ton.

Wood Creosote.—Unrefined, from 3s. 6d per gal., according to boiling range.

Wood Naphtha.—Miscible, 4s. 6d to 5s. 6d. per gal.; solvent, 5s. 6d. to 6s. 6d. per gal.

Wood Tar.—£6 to £10 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb.; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—1s. 2d. per lb.; P.G. 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10-cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—December 21.—The prices of LINSEED, RAPESEED, COCONUT, PALM KERNEL, GROUNDNUT and WHALE OILS, as well as ACID OILS, remain the same (THE CHEMICAL AGE, October 30). These prices continue for periods ending January 1, 1949, in respect of crude oils, and January 29, 1949, for refined oils. ROSIN and TURPENTINE prices remain the same, according to grade.

Chemicals
INDUSTRIAL AND FINE

CROSSED KEYS BRAND

HYDROGEN PEROXIDE
All grades and concentrations
PEROXYGEN COMPOUNDS · including SODIUM PERCARBONATE · MAGNESIUM PEROXIDE · ZINC PEROXIDE · UREA HYDROGEN PEROXIDE · AMMONIUM, SODIUM AND POTASSIUM PERSULPHATES · BENZOYL PEROXIDE

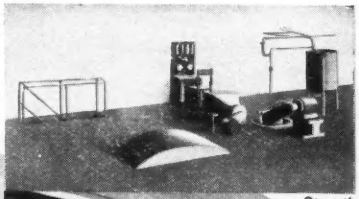
BARIUM COMPOUNDS
SODIUM SULPHIDES · SODIUM ACID PHOSPHATES · SODIUM HYPOCHLORITE · METALLIC SOAPS SULPHATED FATTY ALCOHOLS SODIUM METASILICATE · ALKALINE CLEANERS

LAPORTE
LAPORTE CHEMICALS LTD., LUTON.
Telephone: Luton 4390 Telegrams: Laporte Luton.

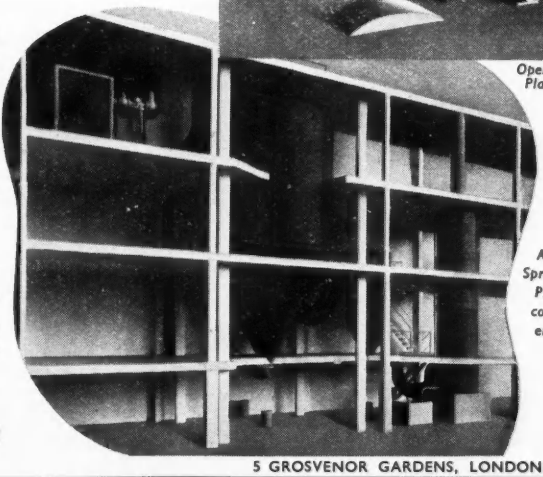
Kestner's
SPRAY DRYING PLANTS

produce a uniform dry powder from solutions or solids in suspension in one operation. The drying is instantaneous and discharge of the finished product is continuous—thus enabling costly sensitive and organic materials like blood plasma or protein hydrolysates to be dried just as easily as metallic salts and industrial chemicals such as Magnesium Sulphate or Sulphonated alcohols.

There are many advantages to be obtained by using a spray drier in your process plant, but only a Kestner Spray Drier will ensure your getting the full benefit of the latest developments in spray drying technique.



Operating Platform



A large Spray Drier Plant in course of erection

Kestner's
CHEMICAL ENGINEERS
5 GROSVENOR GARDENS, LONDON, S.W.1

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

Great Possibilities for

QUALIFIED CHEMICAL ENGINEERS

VAST and far-reaching developments in the range of peacetime productions and markets of the Chemical Industry mean that the profession of Chemical Engineering will be of great importance in the future and one which will offer the ambitious man a career of outstanding interest and high status. The T.I.G.B. offers a first-class training to candidates for the Chemical Engineering profession.

Enrol with the T.I.G.B. for the A.M.I.Chem.E. Examinations in which home-study students of the T.I.G.B. have gained a record total of passes including—

FOUR "MACNAB" PASSES

and

THREE FIRST PLACES

Write to-day for the "Engineers' Guide to Success"—free—containing the world's widest choice of Engineering courses—over 200—the Department of Chemical Technology, including Chemical Engineering Processes, Plant Construction, Works Design and Operation, and Organisation and Management—and which alone gives the Regulations for A.M.I.Chem.E., A.M.I.Mech.E. A.M.I.E.E., C. & G., B.Sc., etc.

THE TECHNOLOGICAL INSTITUTE

OF GREAT BRITAIN

219, Temple Bar House, London, E.C.4

SITUATIONS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order.

ASSISTANT Works Engineer required for construction and maintenance of chemical works in West Riding, Yorkshire. Applicant should be 25-35 years of age; should have sound theoretical training and practical experience in mechanical engineering and chemical works plant. Salary, approx. £600. Applicants should state age, full details of training and experience, to Works Manager, Box No. 2748, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

EXPERIENCED Research Chemist required by North East firm of chemical and gas plant engineers, age preferably 28 to 35. Good academic qualifications essential especially in physical chemistry together with appreciation of plant development, operation and investigational work. Duties involve laboratory work and acting as deputy to present Chemical Research Manager. Salary dependent on experience but not less than £700 per annum. Firm works five day week, has pensions scheme and recreational facilities. Box No. 2749, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

THE Midland Tar Distillers, Ltd., Oldbury, Birmingham, have vacancies in their Research Department for Research Chemists with good qualifications and initiative. A good degree in Chemistry is essential and some industrial research experience is an advantage, but not essential. Applications, in writing, giving full particulars to THE PERSONNEL MANAGER.

WORKS Chemist required by East London pigment factory, for analytical, control and development work. Graduate standard preferred. Reply, stating age, experience (if any), and salary required, to **J. W. & T. A. Smith, Ltd., Maryland Road, E.15.**

FOR SALE

GEORGE 600 COHEN'S

SIMON multitubular **MIXER/DRIER,** c.i. construction. Trough dims, approx. 6 ft. 8 in. long by 2 ft. wide by 2 ft. 3 in. deep, agitator has bank of 7 tubes 2 in. o.d. chain drive. Rectangular bottom outlet, 14 in. by 8 in.

Unused Mitchell Shanks centrifugal **ACID PUMP,** vitreon lined, size and type MS.5/160, 2½ in. diam., suction, 2½ in. diam. delivery, capacity at 1,450 r.p.m., 92/220 g.p.m., delivery head 33/26 ft. Bare shaft extension for vee rope drive. Pump has water cooled casing.

Wooden plate and frame type **FILTER PRESS** by S. H. Johnson, 24 frames, size of cake 28 in. by 14 in. Centre ratchet closing gear, 2 in. diam. feed from self-contained pump. Discharge trough.

Horizontal steam jacketed **TROUGH MIXER,** by Gardner, approx. 6 ft. by 2 ft. by 2 ft., scroll type agitator, pulley driven. Jacket suitable for 15 lb. per sq. in. bottom outlet.

Simon multitubular **MIXER/DRIER,** c.i. Trough approx. 8 ft. long by 2 ft. 6 in. deep by 2 ft. 8 in. wide, agitator, bottom side discharge.

New **FILTER PRESS,** Manlove Alliott, c.i. construction, 32 in. sq. plate and frame type, non-washing, with 20 chambers, 2 in. wide.

Vacuum **EVAPORATING PLANT,** by Morton, 300 g.p.h., tinned copper pan approx. 8 ft. deep by 5 ft. i.d. Steam jacketed with internal steam coil, condenser, vacuum pump.

Unused Mitchell Shanks centrifugal **ACID PUMP,** vitreon lined, size and type MS.7/200, 3 in. diam. suction, 2½ in. delivery. Capacity at 1,450 r.p.m. 154/396 g.p.m., delivery head 46/30 ft. Bare shaft extension for vee rope drive. Pump has water cooled casing.

Vertical enclosed steam jacketed lead lined **MIXER.** Mixing chamber 3 ft. int. diam. by 4 ft. 3 in. deep. With lead covered agitators with two twin paddles. On foot pedestal bearing. Overdriven by fast and loose pulleys 15 in. diam. by 3 in. face, through crown wheel and pinion.

GEORGE COHEN SONS & CO. LTD.
SUNBEAM RD. LONDON, N.W.10.
Tel.: Elgar 7222 and
STANNINGLEY, Nr. LEEDS
Tel.: Pudsey 2241.

FELDSPAR, Quartz, Vermiculite, all minerals.—DOHM LTD., 167, Victoria Street, S.W.1.

NEW STAINLESS STEEL PLANT FOR ALL NEEDS

with quick delivery

Boiling Pans, Tanks of all shapes and sizes
Dyeing and **Drying Racks**
Stainless Steel Buckets
Steam heated vacuum Driers
Acid resisting enamelled ware

We also specialise in finding unusual second-hand items for our customers. If you do not receive our Monthly List please let us have your address. We are not dealers but sell plant on commission. May we help you?

R. F. PAGET Ph.D., C.C.I.
Chemical Engineer
Manor House, Barwick-in-Elmet, Leeds
Tel. Barwick-in-Elmet 216

FOR SALE

BROADBENT 48-in. HYDRO EXTRACTOR, vulcanised basket, electrically underdriven 3-point suspension. Complete with starting equipment, fitted reverse current braking switch.
BROADBENT 48-in. HYDRO EXTRACTOR, with 48-in. galvanised iron basket, complete as above.
BROADBENT 48-in. SUSPENDED TYPE HYDRO EXTRACTOR, overdriven from 15 h.p. motor, 400/3/50 supply, together with Pony motor for slow running.
JOHNSON TIMBER PLATE AND FRAME FILTER PRESS, having 29 plates and 30 frames forming cakes 3 ft. 3 in. by 1 ft. 10 in. by 1 in. Hydraulic closure. (Now working.)
JOHNSON TIMBER PLATE AND FRAME FILTER PRESS, 28 plates and 29 frames, cakes 2 ft. 1 in. square by 1¼ in. closure. (Two available.)
18-in. diam. WILKINSON OINTMENT MILL, with marble refining discs and enamelled hopper and agitator, and complete with driving motor.
TUNGSTONE ACID PUMPS. A number available in Ebonite, Bronze, and Tufnol.

NEWMAN INDUSTRIES LIMITED,
YATE, BRISTOL

ACCURATE Powders for Ceramic, Alloy, Plastic, Paint, etc., industries. DOHM LTD., Pulverisers, 167, Victoria Street, London, S.W.1.

BRUCE Peebles/Pelapone Diesel alternator set, 25 K.V.A. 400/3/50. Complete with switchboard and A.V.R.
TWO—Petters "S" type diesel sets 7 K.W. 230 volts D.C. Onan 2 K.V.A. 230/1/50 petrol engined lighting set, push button control.
WILLIAM R. SELWOOD, Chandler's Ford, Nr. Southampton

CHARCOAL, ANIMAL and VEGETABLE, horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams, "Hill-Jones, Bochurch, London." Telephone: 3285 East.

DISINFECTORS. Two 8 ft. by 5 ft. diam. jacketed. Four 7 ft. by 3 ft. diam. with coils, Two Oval 50 in. by 30 in. by 7 ft. jacketed. New condition. THOMPSON & SON (MILLWALL) LTD., Cuba Street, London. E.14. Tel. East 1844.

METAL Powders and Oxides. Dohm Limted, 167, Victoria Street, London, S.W.1.

NEW Mechanical Loading Shovels, ex stock delivery diesel and petrol.
3 ton Mobile Diesel Crane, on pneumatics, new.
2 ton Mobile Petrol Crane, on pneumatics, new.
6 cwt. Neals Trench Crane, secondhand.
New Muledozer, 6 ft. blade, with Rotaped tracks.
WILLIAM R. SELWOOD, Chandler's Ford, Nr. Southampton.

ROTARY VACUUM FILTER

Drum cell type. 4 ft. 7½ in. diameter × 2 ft. 7½ in. wide. Filter surface 35 sq. ft. 2 h.p. 4-speed motor with starter. Makers, International Combustion Co, Ltd. Brand new condition £1,350

RYLATT & CO.,
64 Fountain St., Manchester
TELE: BLACKFRIARS 9956

FOR SALE

SEVERAL small steam-jacketed Copper Pans.
Several Ball Mills, 6 ft. 6 in. by 6 ft. 8 in., Silex-lined batch type, with driving gear and clutch.
3 Simon type Portable Slat Conveyors, 20 ft. long, for boxes or bags.
Mixing Pan, 6 ft. dia. by 5 ft. deep, flat bottom, open top.
Ditto, 3 ft. dia. by 5 ft. deep, flat bottom, open top.
2—6 in. Centrifugal Pumps by Cherry.
Vertical cross tube Boiler 80 lb. pressure, 7 ft. 6 in. by 3 ft. 6 in.
Milton Grinders fitted with 30 in. vertical stones, belt driven with shaker feeds.
1 Iwel 20 in. Turbine Centrifugal Extractors with spare baskets.
Steam Jacketed Gardner pattern Mixer about 30 gallons capacity.
4 vertical Hall Ammonia Compressors, single cylinder, belt driven cylinders 3 in. to 5 in. bore.
3 Alfa-Laval Disc Separators, belt driven, size 45 and 65, with chambers 12 in. and 15 in. dia.
2 unused belt driven Ram Pumps, fitted one ram 1½ in. dia., 3 in. stroke, brass fitted.
Alpine type Perplex Grinder, chamber 20 in. dia.
Ditto similar, chamber 18 in. dia.
Single pair toothed Crushing Roll, belt and gear driven, last used for soap crystals.
4 Steam Jacketed Mixing Pans.
Several A.C. motors, 3–10 h.p.
Three jacketed Mixing Pans with agitators.
12 in. Harrison Carter 4 screen Disintegrator, with fan and cyclone.
21—3 gallon capacity Ball Mills.
4 Mather & Platt Colloid Mills.
500 ft. B.B. Gravity Conveyor, steel rollers, 14 in. long by 6 in. pitch.
Torrance Positive-geared Edge Runner Mill.
Torrance Combination Mill, comprising edge runner, horizontal pug, and granite roller mill.
9 Riveted Vessels, partly jacketed and plain, with agitators and coils, as used in oil-refining trade.
Brook 80 h.p. A.C. motor, 400 volts, 3-phase, 50 cycles, with starter gear.

Write: RICHARD SIZER LIMITED, ENGINEERS
CUBER WORKS, HULL

1 Riv. Enclosed Tar Tank, 8 ft. by 8 ft. by 4 ft. 6 in., fitted 2 in. bottom coil and 1 in. circular coil, £50. One Riv. Cylindrical Enclosed Tank, 3 ft. 4 in. diam. by 6 ft. 6 in. high. Price £15. THOMPSON & SON (MILLWALL), LIMITED, 60 Hatcham Road, Old Kent Road, S.E.15. Tel.: East 1844.

PUMPS

34 Beresford **ROTARY PUMPS,** type 8501S. 3,000 g.p.h. against 8 ft. head at 700 r.p.m., 2 ft. suction. 2½ in. inlet and outlet, flange fitting. Drive shaft ⅝ in. in diam. Ref. 583 M.
35 NEW "Kechavite" **ROTARY ABUTMENT** (geared) **PUMPS.** Type A.V. 550. 1½ in. inlet and outlet, flange fitting. Pressure 400 lb. sq. in. Splined drive shaft. Ref. 197.

COX & DANKS, LIMITED
Plant & Machinery Dept.,
Faggs Road, Feltham, Middx.
'Phone–Feltham 3471

'Phone 98 Staines

200 gallon Steel Cylindrical Mixer.
200 lb. capacity Jacketed Steel Mixer, electric drive.
3-speed Morton 80-quart Bowl Mixer.
Triple Granite Roll Refiner.
8 in. delivery Electric Fan, 415/3/50.
Jacketed enclosed Horizontal Mixer, 800 gallons.
Jacketed Vacuum Oven, 7 ft. by 3 ft. 6 in.

HARRY H. GARDAM & CO. LTD.,
STAINES

1000 **STRONG NEW WATERPROOF APRONS.** To-day's value 5s. each, Clearing at 30s dozen. Also large quantity Filter Cloths, cheap. Wilsons, Springfield Mills, Preston, Lancs. Phone 2198.

FOR SALE

STAINLESS STEEL COIL HEATED VESSEL, 350 gall. capacity, 3 ft. dia. by 8 ft. deep with 9 turns 1½ in. bore stainless steel coil. Mounted on three mild steel channel legs and vessel, complete with bolted-on cover, usual connections and sampling cocks.

STAINLESS STEEL 100 GALL. STEAM JACKETED TILTING BOILING PAN, mounted on mild steel stand and fitted with hand tilting mechanism. Complete with pressure gauge, valves, etc.

DITTO of 60 gall., capacity with aluminium pan and jacket.

ONE TON RECTANGULAR STAINLESS STEEL TRANSPORTABLE TANKS, 6 ft. by 3 ft. 6 in. by 2 ft. deep, mounted on mild steel chassis fitted with four bogy wheels.

100 GALL. UNDERDRIVEN STAINLESS STEEL MIXER, 2 ft. 6 in. dia. by 3 ft. 3 in. deep, with flanged outlet. Mounted on mild steel transportable stand and complete with bolted-on cover fitted with charging hole.

100 GALL. CAPACITY STAINLESS STEEL STORAGE TANKS, approx. 2 ft. 11 in. dia. by 2 ft 11 in. deep, fitted with sloping bases and 1 in. B.S.P. screwed outlets.

20 GALL. CYLINDRICAL STAINLESS STEEL CONTAINERS, 15½ in. dia. by 31 in. deep, with lids and carrying handles and fitted with ¾ in. bore outlets.

10 GALL. RECTANGULAR STAINLESS STEEL BUCKETS, framed with mild steel angle and complete with carrying handles.

Box No. NCA, PEARCE'S ADVERTISING, Merchant Street, Bristol, 1.

SERVICING

A Skilled team of engineers and fitters available for outside erection or dismantling, survey, inspections, etc., of large power plant of any description. For details, write to G.P.U. LTD., Service Division, Wembley.

DOHM, Ltd., pulverise raw materials everywhere, 167, Victoria Street, London, S.W.1.

GRINDING, Drying, Screening and Grading of materials undertaken for the trade. Also Suppliers of Ground Silica and Fillers, etc. JAMES KENT, LTD., Millers, Fenton, Staffordshire. Telegrams: Kenmill, Stoke-on-Trent. Telephone: 4253 and 4254, Stoke-on-Trent (2 lines).

GRINDING of every description of chemical and other materials for the trade with improved mills.—THOS. HILL-JONES, LTD., "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Hill-Jones, Bochurch, London." Telephone: 3285 East.

LONDON FIRM offers complete service packing powders of all descriptions, also liquids and chemicals. Long runs only. Containers and packing cases for home and export, made on premises. Near to docks. Own rail sidings. Box No. 2331, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

MACHINERY Installations—try R. A. COLLACOTT & PARTNERS, 70, Victoria Street, London, S.W.1. (VICtoria 0179/9771).

AUCTIONEERS, VALUERS, Etc.

EDWARD RUSHTON, SON AND KENYON (Established 1805).

Auctioneers, Valuers and Fire Loss Assessors of CHEMICAL WORKS, PLANT & MACHINERY
York House, 12 York Street, Manch...

Telephone 1937 (2 lines) Central, Manchester.

SURPLUS
RE-CONDITIONED
CHEMICAL
PLANT &
MACHINERY
for
IMMEDIATE
DELIVERY

State your requirements
to

HODSON
& CO. (MACHINERY) LTD
TOTTINGTON · BURY · LANCS

PHONE: TOTTINGTON
123

WANTED

ANY kind of Merchandise bought for cash. Govt. surplus, redundant stocks, job lines, anything. Write G.T.C. 82/94, Seymour Place, London, W.1.

CAST Iron Piping, 30 in., 24 in., 18 in., 14 in., 12 in. and 10 in. bore. Large quantities of each size required. Please offer any quantities available stating where lying and price. Box No. 2750, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

WORKING NOTICE

THE proprietor of British Patents Nos. 565778 and 573244, entitled "Process for the Preparation of Pyrazine Tetracarboxylic Acid," and "Processes for Producing 2-amino-3-carboxylpyrazines," respectively, offers same for licence or otherwise to ensure practical working in Great Britain. Inquiries to SINGER, EHLERT, STERN & CARLBERG, 28, East Jackson Boulevard, Chicago, 4, Illinois, U.S.A.

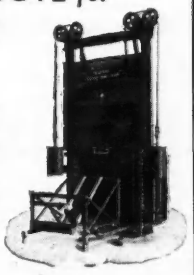
Specialists in
Carboys, Demijohns, Winchesters
JOHN KILNER & SONS (1927) LTD.
Tel. WAKEFIELD 2042 *Established 1867*

COMPLETE PLANTS FOR THE PRODUCTION OF CHLORINE
from Hydrogen Chloride, and regeneration of Hydrogen Chloride from Chlorination and other processes
CHEMICAL PLANT & EQUIPMENT CO. LTD.
18, Palace Gardens Terrace, London, W.8
Phone: BAY 7727

BELTING
AND
ENDLESS VEE ROPES
Superlative Quality
Large Stocks - Prompt Despatch
FRANCIS W. HARRIS & Co. Ltd.
BURSLEM - Stoke-on-Trent
'Phone: Stoke-on-Trent 87181-2
'Grams: Belting, Burslem

CHEMICAL LEADWORK
TANKS — VATS — COILS — PIPEWORK
W. G. JENKINSON, Ltd. Telephone 22473
156-160, ARUNDEL STREET, SHEFFIELD

ACTIVATED CALCIUM CARBONATE
is a speciality of Derbyshire Stone Ltd., for processes where the utmost dispersibility and miscibility are an advantage.
Enquiries are invited from those interested in the supply of such powders. Samples and full information will be gladly provided. Please state nature of probable application of the powders. Problems investigated without obligation.
DERBYSHIRE STONE LTD
Bank House, Matlock, Derbyshire
Phone: Matlock 206

MAY WE QUOTE *for*
STEEL PLATE WORK?

Our long experience and excellent facilities help us to make first class Jacketted Pans, Stills, Autoclaves, etc., which please our customers
Let us try to please you!
LEAKE & BRADFORD BOILER Co. Ltd.
STANNINGLEY - - - Near LEEDS

TANTIRON

The original and still the best acid resisting high silicon iron alloy

Sole Manufacturers :

Lennox Foundry Co. Ltd.

Glenville Grove, London, S.E.8

Specialists in corrosion problems

"LION BRAND"

METALS AND ALLOYS

MINERALS AND ORES

RUTILE, ILMENITE, ZIRCON, MONAZITE, MANGANESE, Etc

BLACKWELL'S METALLURGICAL WORKS LTD.

GARSTON, LIVERPOOL, 19

ESTABLISHED 1869

Wanted

by **R. A. Collacott & Partners CHEMICAL ENGINEERS**

your enquiries for

★ Machinery Installation
★ Special Machines
★ Geared Motors
★ Machine Repairs, Overhauls, etc.
★ Structural Steelwork
★ Rolling Mills, etc.

R. A. Collacott & Partners

70 Victoria St., London, S.W.1

Telephone : VICtoria 0179 or 9771

LACTIC ACID

SULPHONATED OILS

TANNERS' MATERIALS

• • •

BOWMANS CHEMICALS, LTD

CHEMICAL MANUFACTURERS

Moss Bank Works : : : Near WIDNES

Empty Barrels & Drums

GENERAL AND EXPORT COOPERS AND DRUM RE-CONDITIONERS

T. H. FIELDING & SONS LTD.

CLARENCE ROAD · HUNSLET · LEEDS

Phone: 22675 Branch Works at Hull

DECOLOURISING CARBON
BLEACHING EARTH
BENTONITE

Telephone : Woolwich 1158 (2 lines)

WRITE FOR SAMPLES AND QUOTATIONS

Telegrams : Scofar, Wol. London

FARNELL CARBONS LIMITED

Conduit Road, Plumstead, London, S.E.18

COTTON BAGS

AND

LINERS for SACKS, BARRELS and BOXES

WALTER H. FELTHAM & SON., LTD.

Imperial Works, Tower Bridge Road, London, S.E.1

ELECTRIC

MOTORS

REWOUND REPAIRED MAINTAINED

Bought, Sold or Exchanged

THE ELECTRO-POWER SERVICE CO.

15-17 HOWARD ROAD, LEYTONSTONE, E.11

Phone : MARYLAND 2788

The FLOOR of AGES

RESISTS

ACIDS AND ALKALIS

INSTALLED by a variety of industries for its rock-like permanence, The Floor of Ages also adds acid and alkali resistant to its honours. And rightly so. Exacting practical tests prove conclusively that The Floor of Ages is an effective, permanent resistant that is saving time and money for leading firms at home and abroad.

If you would like to know how The Floor of Ages can solve YOUR problem, simply write or phone our Technical Dept.

TANK LININGS

Bolton & Hayes are specialists in linings for bleaching cisterns, B&H LTD formaldehyde storage tanks, and acid and alkali vats, etc.

BOLTON & HAYES LTD.

VIKING HOUSE

Manchester Road, Bolton Tele. 4067

CALLOW ROCK

Gas-Burnt

LIME

for all purposes

• • •

QUICKLIME

(*Calcium Oxide*)

of the highest commercial quality, in lumps or in coarse powder form

HYDRATED LIME

(*Calcium Hydroxide*)

In Standard and Superfine grades to meet most industrial requirements

• • •

The Callow Rock Lime Co. Ltd

CHEDDAR Somerset

Agents: DURHAM RAW MATERIALS, LTD., 1-4, Great Tower Street, LONDON, E.C.3.

GRINDING

Grading, Mixing, Sieving or Separating and Drying of materials, etc., undertaken for the trade

Also Suppliers of

GROUND SILICA, FILLERS, AND CHEMICALS

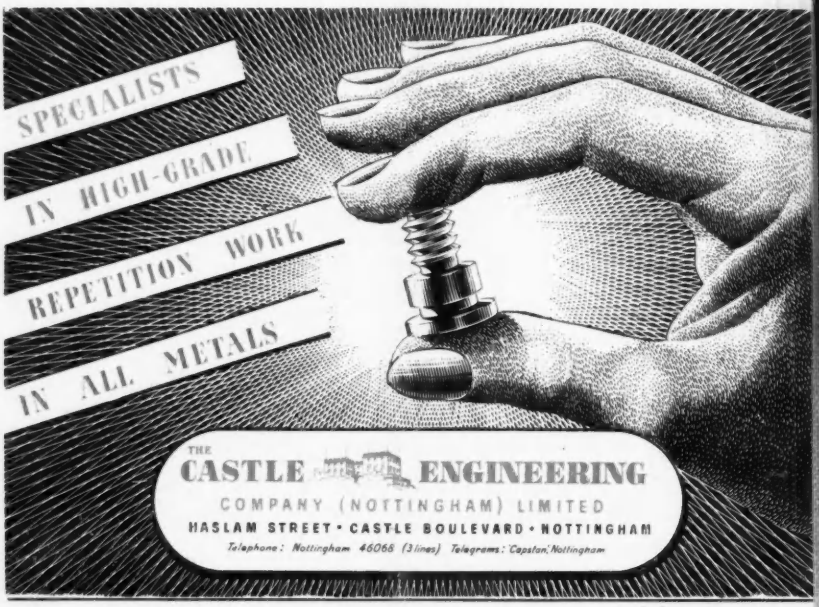
JAMES KENT

LIMITED • MILLERS

MANOR STREET, FENTON

STAFFORDSHIRE

Phone: Stoke-on-Trent 48835/6/7 (3 lines) Grams: Kenmil, Stoke-on-Trent



"STILL LEADING"
For CHEMICAL & ALLIED TRADES
ACID RESISTING
CEMENTS & LININGS
For PICKLING TANKS, FLOORS, DIGESTERS, KIERS, STONE, CONCRETE, BRICK, WOOD, IRON VESSELS & ACID TOWERS
PICKLING TANKS 80 FEET LONG WORKING SUCCESSFULLY
RIZISTAL
AN ALL BRITISH PRODUCT
RIZISTAL TRADE MARK
RESISTS
Formaldehyde, Alcohol, Oils, Greases and Tar Acids, Benzene, Toluene Compounds HCl, H_2SO_4, HNO_3, and H_3PO_4 mixed HNO_3 and HF Acids, Aqua Regia, Formic, Acetic, Lactic, Oxalic, Chromic Acids, Bisulphites, Hypochlorites, Mixed Acids, Peroxides, Nascent Halogens and Alkalies.
UNDER STEAM PRESSURES
SOLE MAKER OVER 50 YEARS' EXPERIENCE
JOHN L. LORD
WELLINGTON CEMENT WORKS
TELEGRAMS: "CEMENT" PHONE: BURY 617
BURY, LANCASHIRE

Printed in Great Britain by THE PRESS AT COOMBELANDS, Ltd., Addlestone, and published by BENN BROTHERS LTD., at Bouverie House, 154, Fleet Street, E.C.4, 25 December, 1948. Registered at the General Post Office. Entered as Second Class Matter at the New York U.S.A., Post Office.